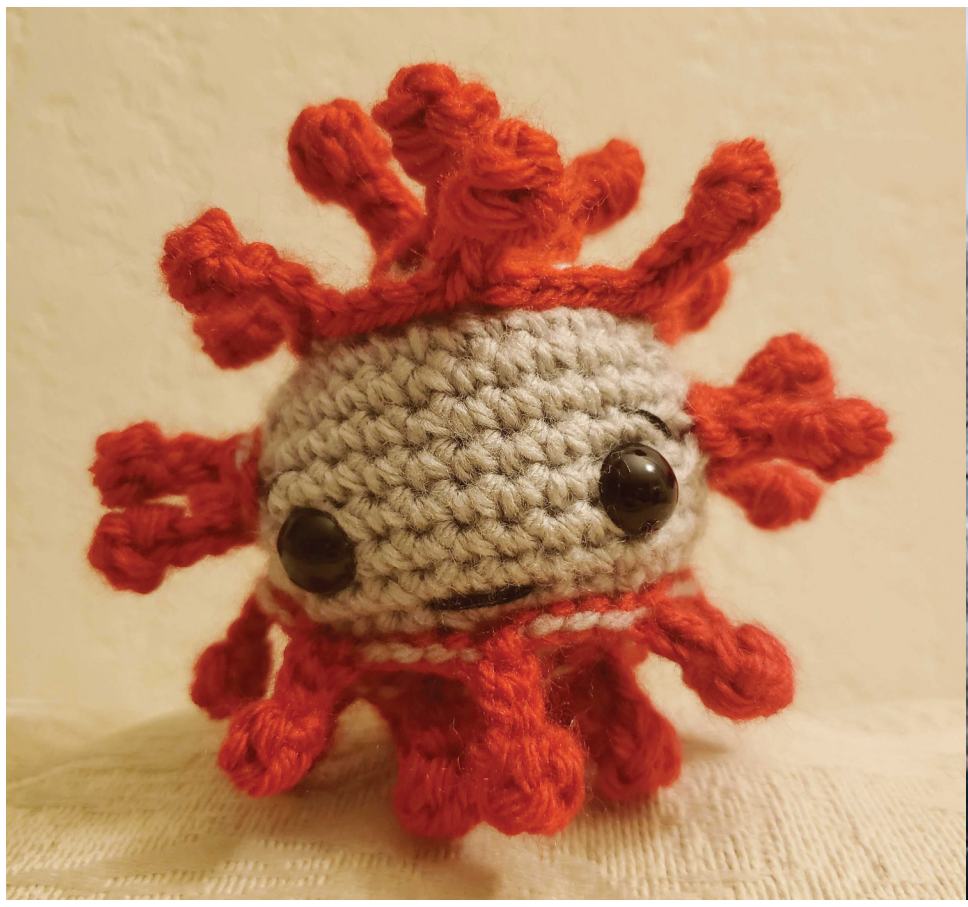


The Tech

2020

Year in Review

Dear readers,

You probably never want to hear the word "unprecedented" again, but as we readily say our goodbyes to the unprecedented time that was 2020, I'll play devil's advocate and say that technically, every time is unprecedented. Just as we've learned from swimming through hundreds of psets and sample problems, no amount of practice can truly prepare us for a test, an interview, or in the case of 2020, a pandemic that we've never seen before. Even so, experiences and lessons from the past are our best references for guiding our approach to new challenges. After all, hindsight is 20/20.

With this in mind, *The Tech* has done its best to document the relentless influx of news this past year, in hopes that some future MIT community can look back and learn from the crises we personally lived through. Moreover, this year in review also acts as an opportunity for us to recognize and reflect on the stories of change, upheaval, and resilience that have molded the present MIT community.

Our last volume ended before the disease that has besieged this year even had a name, with a headline reading "Coronavirus has no 'identified risk to the MIT community.'" Two months of escalation proved this wrong, and we published an in short with the surreal headline, "Move out date, classes canceled, online instruction" mid-March. Thousands of undergraduates scrambled to pack up their lives and part from classmates, with packing tape, cardboard boxes, Purell dispensers, and long hugs replacing psets, papers, and exams as we departed campus for a scarily indeterminate amount of time. Residents of the soon-to-be demolished Burton Conner prematurely bid their beloved home goodbye, and in a matter of days, the halls of MIT were left vacant and quiet.

But that wasn't the end. In the year where doomscrolling entered our vocabularies, summer saw COVID-19 cases continue to rise, climate change-influenced disasters rage, xenophobic executive orders alienate international students, and a nationwide reckoning of policy brutality and racism against Black Americans lift protestors demanding justice to their feet. These momentous events pushed MIT to reevaluate its insufficient work in valuing the crucial yet underrepresented members of our community and in providing an education that leaves students well-versed not only in their courses of study but also in serving as productive, respectful, and inclusive members of the society they'll soon step into. Op-eds calling for action on diversity, equity, and inclusion convened in the Opinion section on an almost weekly basis, standing firm beside articles questioning whether MIT has been doing enough to confront the inevitable climate crisis and whether MIT's institutional ethics in accepting funding from individuals and industries accurately represent its moral grounds.

As we transitioned into an exhausting and isolating remote fall semester, the compounding stress of Zoom fatigue, extra units, and application season met an equal in the chaotic presidential election. Desensitized by a college student's sleep schedule, some stayed up on election night, only for it to drag into a week of election limbo. Following 2020's patterns of spiralling, the election's aftermath added insult to injury by casting doubt on the very state of democracy.

Leaving behind one year of uncertainty for another, the MIT community starts 2021 dispersed across time zones; for most, classes, research, and student life and culture reduced to now-familiar pixels. It's overwhelming to imagine how life will be this time next year. Still, just as we did in 2020, *The Tech* will do its best to chronicle each turn taken in 2021. If there's anything you would like to see covered, we want to hear from you — to ensure that our version of the year encompasses as much information and as many perspectives and voices as possible — so best to serve our readers now, in the future, and in every other unprecedented time.

— Kristina Chen '23
Volume 140 Editor in Chief

CAMPUS LIFE

CAMPUS LIFE IN REVIEW

In contrast to the decline of campus life at MIT after a majority of undergraduates moved out mid-March due to the coronavirus pandemic, Campus Life at *The Tech* has experienced a modest reawakening this year, thanks to the insightful contributions of both community members and our own editors. Seven new columns were born, including the beloved biweekly *Wenbo's Walks* — featuring the eponymous editor's wandering streams of consciousness — the uplifting *Community Immunity* — recounting stories of the people we leaned on while we were forced to leave campus — and the educational *Equali-tea Time* — bringing to light the experiences and voices of the LGBTQ+ community.

Pieces submitted to these columns and to Campus Life in general opened a window through which we could view our common anxieties when we swapped out squeezing into seats beside our friends in 26-100 for a year of socially distanced Zoom fatigue in childhood bedrooms and temporary homes, reckoned with the nation's long overdue confrontation of systemic racism and police brutality against Black Americans, and experienced a historically tumultuous election week and its equally tumultuous fallout. Through the same window, we were comforted by the voices of our classmates who expressed similar sentiments and fears, as our entrance into adulthood coincided with the most turbulent year of our lives.

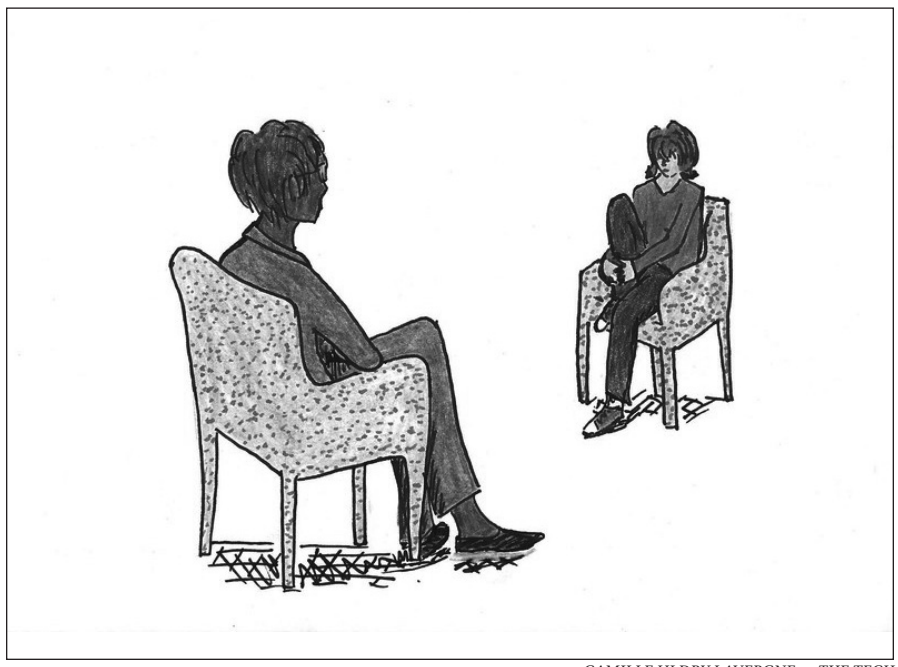
As we all hope for a return to a somewhat normal campus life this year, I hope the Campus Life section reflects the revival of MIT's vibrant and eclectic student cultures and communities recouping after an isolating year. I hope that you'll be able to walk with a friend down the Infinite, pick up a printed copy of *The Tech*, and see a story like your own written in the pages of this section. And if you feel so inclined, I hope you open up your computer and send us your story at *cl@tech.mit.edu*.

—Kristina Chen '23
Volume 140 Editor in Chief

BY THE NUMBERS

A ten-step guide to living in a pandemic

What my trauma taught me about purpose, autonomy, and living



CAMILLE ULDRY LAVERGNE — THE TECH

"I told my dean at S3 that I just didn't know how to choose anymore. Every choice felt like a misstep. Every decision felt life or death."

By Ana Reyes Sánchez
EDITOR

I once spent three days berating myself for adding five too many u's to "i love youuu." Three u's is normal, eight u's is not. Maybe this is familiar to you, maybe it's not. At one point I realized that maybe analysing the number of u's in the "love you too" text I received isn't healthy.

The point is this: I went to VPR to ask about something that was bothering me about my relationship. I ended up talking about my past.

Three years prior to that, my ex-girlfriend and I were threatened with suspension for holding hands at school. My VPR advocate described my trauma with an analogy:

You walk into a grocery store. You look up from the canned tomatoes and find yourself looking straight into the face of a tiger. You run out of the grocery store.

Maybe, you return to the store a year later. You stare at the aisle you saw the tiger in, feeling crazy for thinking there was ever a wild animal there. Look at how normal the grocery store is. You keep searching for tigers, every time you return.

Somewhere, a missing puzzle piece clicked in place.

I began to check myself routinely. How many u's does it take for someone to realize that I'm gay and not just friendly?

The relationship that I didn't bring up at the meeting turned toxic for me. I felt myself disappearing when I was with my partner, and found that my decisions and autonomy were being taken from me. Later, I would get comfortable using the words "sexual assault" and "manipulation" to describe what happened.

Very quickly, I began to see how it had affected me. I was unable to make decisions altogether. I would wake up in the morning and feel my body shake with anxiety. I asked my friends for their opinions on everything, berated myself when my intuition didn't line up with theirs. I told my dean at S3 that I just didn't know how to choose anymore. Every choice felt like a misstep. Every decision felt life or death.

I thought about the deaths of the people that I love, and how anyone can be hurt. I was always aware of the sexual assault statistics, knew that usually women are raped by people that are close to them. I became very aware of this in my own life and hated this intrusive part of my thoughts.

How do you deal when your life has become a statistic? How do you cope with the ever growing numbers?

When we were kicked off campus, I saw a reflection of my trauma in the actions of other people. I thought, again, about the tiger in the grocery store. I reassured my friend when she worried about whether she should buy gluten-free cookies or if she was taking them from someone else. I listened to another talk about the anxiety of facing decisions that felt life or death.

I read a confession that said we shouldn't use MIT resources during the pandemic because other people needed it more, because everyone was sad. I'd experienced that too, felt unjustified in going to VPR because, surely, what happened to me wasn't that bad.

People are struggling more than me. People are struggling less than me.

This is true of my first and second traumatic events, but it doesn't mean that I shouldn't have reached out to get help. It doesn't mean that I don't deserve the help I got.

My trauma changed my life — for the worse, in most aspects. There are some buildings I still don't want to walk into. I have an increased awareness of who is touching me. There are times I am faced with unsolvable choices, and I spend a lot of time aware that my life is not the way that I imagined.

But the one rhetoric I always hated was the implication that I was somehow surviving something. I wrote to my friend, I am not surviving, I am living. I stand by those words.

Trauma took away my purpose and certainty. Initially, I was anxious to get back to "normal," as if I had ever felt that. The more I look back now, the more ridiculous it seems. Of course a traumatic experience was going to change me. I was never going to "fix" the harm that was done to me, but that didn't mean I couldn't regain what I had lost.

Over the course of last semester, my main goal was to regain a sense of autonomy, which I hoped would give me what I was missing. Here are some changes I made, when things were the worst:

1. **Lessen the amount of decisions I had to make.**
   At one point in the semester, I spent a week debating if I made the right choice when picking breakfast. When I grew tired of debating, I decided if I only have eggs in the fridge, I can no longer have yogurt. I grew accustomed to eating the same thing every day: two eggs, sunny side up, with three tortillas. The first two tortillas were to break the yolk, the third was to wrap up my egg in a taco and finish. When I'm better, I add back choices — yogurt, coffee, bread instead of tortilla, maybe a mandarin? But when I just can't choose, I eat eggs and tortillas.
2. **Spend time with my friends, but don't always talk about my trauma.**
   At best, I dwelled on the past. At worst, I fell into a spiral of doubt again. I asked my friends to hold me accountable to not discussing trauma, even when I brought them up casually. When I felt ready to talk and process feelings, I would say them in private, intentionally and purposefully.
3. **Know when to entertain thoughts, and when to save them for later.**
   I told my VPR advocate, at the very beginning, that I have trouble sleeping because I keep thinking ~cursed thoughts~. When I thought something I didn't want, she said, visualize putting it in a box that I could open later. I thought it was slightly absurd until I tried it. It doesn't always work, but sometimes reassuring myself that I'll deal with it, just not now, soothes my initial anxiety.
4. **Give myself the space to process feelings.**
   Every week for the past year and a half, I have gone to talk to a professional about my problems. There I found a time and space to think about the thoughts I had been avoiding. I learned how to acknowledge my thoughts without giving them the space to consume my mind.

   I know this is not a possibility for most people right now. I have not been able to talk to a therapist since I left campus, but giving myself a non-judgemental space can be helpful too. I've always found this through writing, so I've blocked out a part of my day to journal about the thoughts that linger in my head.
5. **Accept that I care about myself.**
   I told my therapist, once, that I was never enough. I wasn't smart enough, good enough, or kind enough. She told me to close my eyes and think about someone that I love, really imagine it. Then, she asked me to imagine telling my friend that she wasn't enough. Repeat it out loud, she said. I thought about my friend standing in front of me, holding my hand with an open expression on her face. I couldn't say it.

   It's a common piece of advice. If you can't say it to others, then why say it to yourself? I never followed it. My therapist told me, "You wouldn't be here without caring about yourself. Allow yourself to feel that care."
6. **Figure out what it means to care for myself.**
   I think most people understand that there's a difference between commercial self-care and actual self-care. When I first attempted to figure it out, sleep and food were my top priority. These were gradual changes: cooking with my friends, giving myself stricter bedtime rituals, etc.

   Eventually, I realized that understanding my feelings was possibly more important. My therapist had a card with different feeling words, grouped into types. It was easy for me to identify the broad feeling — sad, stressed, angry, happy — more difficult to learn the specifics — powerless, lost, dejected, secure.

   But figuring out these differences helped me understand what I needed to do to help myself. When I felt powerless, I needed to reassure myself of my autonomy. When I felt lost, I needed to ask for help with the things I didn't understand. Even acknowledging the how and why of emotions made me feel in control of the feelings that felt the most uncontrollable.
7. **Self soothe, when I need it.**
   I wrote in my high school journal that I felt ashamed for kissing the top part of my knee when I was overwhelmed. I no longer feel this shame. It is no longer kissing, because I can't always do that subtly, but I stroke my arms. In my very worst, what I am missing is always kindness. It is necessary, then, to remind myself how to be kind with my body.
8. **Move.**
   I'm sedentary by nature and don't like exercising. I also get waves of anxiety for seemingly no reason sometimes. My hands get jittery, my brain starts whirring. When this happens, I put on a song, dance awkwardly and laugh when I see my reflection trying to twerk. More often than not, I discover that the jitters were from being too stationary, and can be resolved easily. It was important to realize that my mind and body are not as separate as I thought, and that helping one helps the other.
9. **Tell myself that the solution isn't apathy.**
   Every once in a while, I would overcorrect and my problems would swing to the other extreme. Suddenly, my actions were meaningless. It was freeing, at first. I need to send an email? I no longer needed to think about the appropriate phrasing for words. I need to talk to my TA? I no longer wonder if they secretly resent me. It was an easy trap to fall into. For once, my decisions were easy. I picked arbitrarily and purposelessly. And when I inevitably emerged from that hole, I would be left with the fallout: dropping grades, food spoiling in the fridge, and a number of concerned friends.

   I love existentialism. I find something oddly inspiring about finding value in the meaningless. But the only thing nihilism gave me was a disillusion with living; this is why it's the most important philosophical problem. It fit right into my sense of purposelessness. It is more difficult for me to care, but I have to believe it is worth it.
10. **Find a goal.**
    My therapist asked me close to the beginning, "What does recovery look like?" I didn't have an answer. I was throwing myself into recovery without even really knowing what it meant. I have learned that what recovery means to me is picking myself up when I feel helpless. It's not about perfection on the first try, but gradual improvement.

I extend the same questions that I asked myself to you. How should you take care of yourself? What does recovery from this pandemic look like to you? What feelings do you have that you feel like you shouldn't, or haven't properly looked at?

Especially during this pandemic, I have to redefine what it means for me to be doing well. I can no longer say that it means going to the gym, or therapy, because I am limited to my house. Here's what I've found it means for me: walking with my parents, feeling confident enough to reach out to my friends, and waking up to make breakfast.

I do not have all of the answers to how to heal from this. Even now, there is that helpless feeling in my stomach. Even now, there are seeds of doubt regarding my value and worth. But it's helped to know where I'm going. And, eventually, I know I will get there.

ME VS. ME

Can professional development align with social justice?

Delayed gratification, but chewed up and spit back out again

By Joanna Lin
EDITOR

This summer, I stayed at home and studied for the MCAT. Among other things, it's a relatively important part of the foundation of my future. And it's hard; believe me and the thousands of other students who crammed for the hundreds of rescheduled tests. Yet my friends and I have all been experiencing the additional mental burden of academic work during *this particular summer.*

What does it mean to read about oxidation and reduction in a galvanic cell when continued police brutality against Black Americans have galvanized the country into two opposing cells? To watch a Khan Academy video on Maslow's hierarchy of needs and know that more than 20% of Americans face food insecurity? Studying for a test with a $300 price tag feels unnervingly superficial given our current political climate, no matter how I look at it.

Doing well on my MCAT will set me up to go to medical school, where I will be learning about how we currently know how to heal, maintain, and cultivate the human body (or, I guess, the white male body). I don't think there is any other profession in the world that combines science, service, and empathy so succinctly. I don't think there is anything else I'd rather be doing in the world. However, a necessary step towards being a doctor is to study for and take the MCAT. I have to do well so that I can do good.

But in the back of my mind, I'm always thinking that I should be doing more now. I should be volunteering at a hospital, or delivering groceries to those who are quarantined. I should be participating more in the conversations about health-, race-, or poverty-related equity in our society. I should be at protests, if not carrying a sign, at least handing out water bottles at the medic tents. But I am doing none of those things.

What does it say that I have the means to study for an entire summer? That I don't *need* to get a job or take care of young or ailing family members? For all the money I've given, petitions I've signed, and discussions I've been part of, it always feels like I could be doing more if I were not studying for the MCAT. With the movement to prevent mundane Instagram posts from returning, going on with my study plan seems like a lack of acknowledgement of the revolution outside.

This feels like guilt. Heavy, smothering guilt that I am not doing enough today, and when I finally find the time tomorrow, it will be too late. But, as we've all seen on social media, guilt is not the way forward, and centering the conversation on my guilt is the last thing I want to do.

Now that my test is over and we are all preparing to start a new semester, I think it's more important than ever to continue consciously learning (and unlearning!) about what our society is and can be. It would be all too easy to slip back into the pattern of lecture, recitation, pset, midterm, but is my GPA really more important than social and political engagement?

Medicine (along with academia) commonly removes itself from political discourse as one of those fields that serve people, regardless of political ideology. One thing that I've been trying to do is learn more about the racism and sexism built into the medical system, not only in the care provided to the public, but also in medical education. Why is it that every medical school application costs upwards of $200 with secondaries, when students are applying to nearly 25 schools each cycle?

Taking the time to read one article a week about what the medical field has put patients through, whether conscious like the Tuskegee Syphilis Study or unconscious like feeling the need to portray a loved one as "a good person," is a stepping stone. I hope it will help me reflect on the profession I intend to enter, and I hope it will remind me to judge slowly and empathize quickly. After all, you have to be aware of the problems before you try to fix them.

EQUALI-TEA TIME

Welcome to the table

A glance at one transgender experience

By Nathan Liang
PUBLISHER

Transgender is a term that describes people whose gender identity does not agree with the sex they were assigned at birth. A person's sex is usually defined by biological markers, such as genitalia or chromosome designations, whereas gender identity is a socially understood concept of how people present themselves along the gender spectrum.

One of the clearest memories I have from when I was younger (maybe five or six years old) is asking my mother this: "Is it possible that I am a boy's spirit trapped inside a girl's body?"

Her response to this was dismissive: "You're just making yourself think that."

I remember feeling crushed. I was confused and at a loss. Was I really making myself think that? Wasn't I taught to follow the beliefs I held in my heart? And why was it that everytime I saw a shooting star in the night sky, I'd close my eyes, hold my hands together, and wish with all my heart to wake up the next day in a boy's body?

Gender dysphoria is often succinctly described by the saying "I was born in the wrong body." This thought often persists in the minds of transgender people. Being identified as the wrong gender brings anxiety. Seeing ourselves in a body that doesn't match our gender identity may bring us extreme discomfort.

I struggled with these feelings into middle school, dreading my first period, hating how my body changed as I went through puberty. I developed crushes on female friends, but I didn't like the label lesbian. I didn't know why, but I just didn't vibe with the term. I couldn't see myself completely identifying with it.

It wouldn't be until the summer before my freshman year of high school that YouTube showed me the answer I had been looking for all these years. Trans men were using the platform to document their transitions and talk about what being transgender meant. It was the first time I really connected with a queer narrative. I finally felt like I had found the words to describe who I really was.

Generally speaking, there are two types of transition that a trans person can go through in their life: social and physical.

The social transition is, well, how one socially becomes their preferred gender. This usually means coming out to close friends and family, adopting the desired pronouns, changing one's name, changing one's wardrobe, and the list goes on and on.

When I think back on my coming out experience, I'm always glad to know it ended well. My high school friends and my little sister were really accepting and loving. My mom was confused and hilariously suggested, "Are you sure you don't want to be nonbinary instead?" because she was afraid of the discrimination I may face by going through with such an "extreme" transition from one end of the spectrum to the other. Regardless, she trusted me and supported my decision.

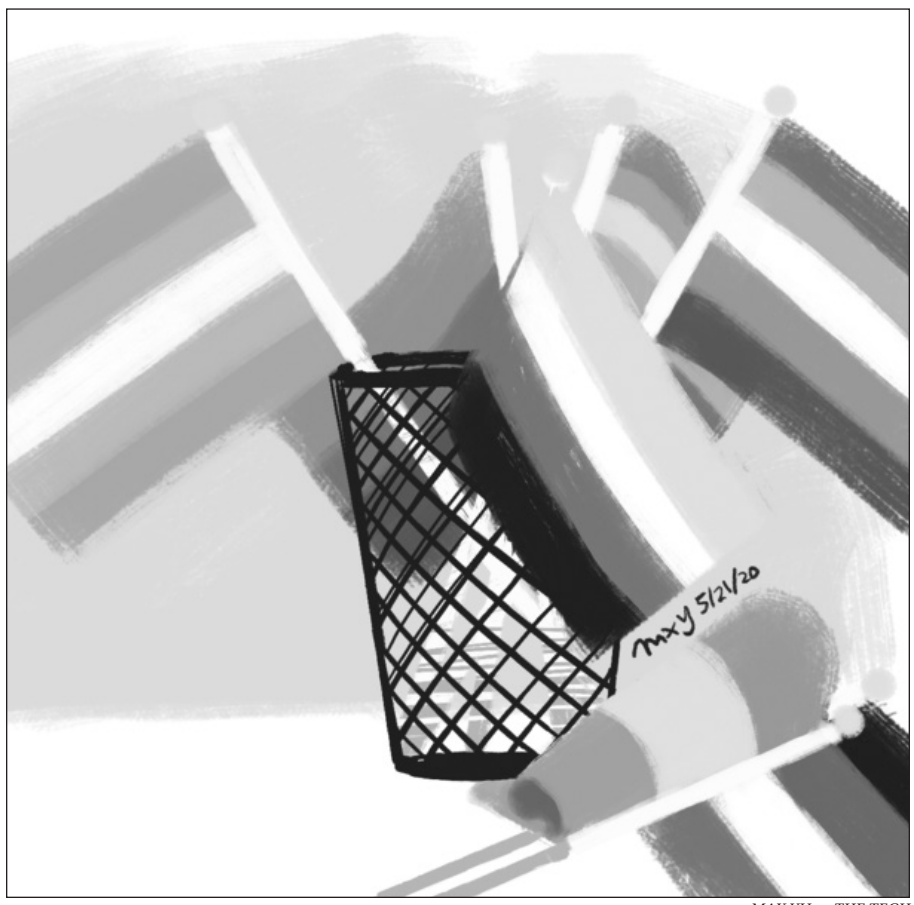
However, the wait leading up to the coming out always makes me think. I was always too scared to come out in high school because I didn't want to be bullied. I waited until after my high school graduation to tell my family because I really believed there was a solid chance I would be disowned and kicked out of the house, despite knowing, deep down inside, that they loved me unconditionally. I was prepared to pack up my things and spend my summer couch surfing at friends' places until I could escape to a new life at MIT.

Knowing I really genuinely thought that… it always makes me a lil sad. It's what compels me now to be a visible example of the trans experience. I want people who are scared to come out to know that unconditional love exists in the world. I was lucky enough to have found it in my family, but it's also important to note that everyone's journey with this will be different. The key is finding a solid support system to help navigate the turbulence of coming out and transitioning. Chosen families also exist for a reason, and I'm always grateful for the one I found at MIT because they understand me on that queer level that my blood-related family just can't.

Along this same vein, I also urge people who aren't trans to work toward a more respectful and accepting world. I don't want trans youth to have to go through what I went through. To have to sit and wait for years, stewing in fear and anxiety and preemptive mourning of relationships that could be lost, just to wait to come out at a moment when they're primed to escape if they have to. I don't want that to be a reality that persists into the future, and changing that takes work from people inside and outside of the community.

Pronouns and names are important to trans people because it is a method of affirming their identity. Especially when trans people are trying to figure out their gender identity or are just beginning to socially transition, having other people affirm them with their preferred pronouns or help them try out new names helps to validate their thoughts and feelings as they explore themselves.

When I came to MIT, I was that really obnoxious trans frosh that would go, "Hi, my name is Nathan and I use he/him pronouns." It was my first time actually being out in the world as male, but since I was pre-physical transition, I was always conscious of the fact that my feminine voice, my round face, and my curvy body would give away the fact that I wasn't born male. To combat this, I reminded everyone I met that my pronouns were he/him. Looking back, I feel a bit embarrassed at how adamant I was about it, but it's how I felt secure in a place as new and chaotic as MIT.



MAX YU — THE TECH

Transgender identity is just one of the many identities that lie along the LGBTQ+ spectrum.

The physical transition can look very different depending on the person. The most common first step for a physical transition is starting HRT (hormone replacement therapy), which usually means taking regular doses of testosterone for trans men and regular doses of estrogen for trans women. Trans men and trans women will often also pursue cosmetic surgery to transform their bodies in ways that alleviate their gender dysphoria. Some trans people decide that physically transitioning just isn't for them, which is cool too.

I started testosterone hormone injections February of last year, right smack at the beginning of my sophomore spring. I was elated to finally start the next step in my transition and the days couldn't pass by quickly enough for me to see the changes I wanted to happen. See, my voice gave me the most dysphoria because I knew it was the one thing that really gave me away as AFAB (assigned female at birth), so when it finally started to drop with the passage of time, the relief was indescribable. Funnily enough, a lot of friends initially asked if I had caught a cold, but I assured them that "No, I was just going through second puberty." This would become an ongoing joke well into my junior fall.

More recently, I've made plans to undergo top surgery to deal with the thing that started causing me the most dysphoria after my voice dropped: my chest. I'm not gonna lie, I'm dreading the inevitable post-op period of recovery, but the important thing is I will no longer feel trapped in my own body. I will have removed a weight off my chest (literally and metaphorically), and those scars will mark the end of my transition. It's bittersweet to know I'll finally close off this chapter of my life, but I got through it and I made it out the other side a much happier, more complete person than I started.

To all my friends and family who've supported me as I transitioned, thank you. I love you all.

Am I welcome here? by Tianyuan "Margaret" Zheng

"Routine" traffic stop

Written on Juneteenth, to myself

By Brian Williams

I want you to understand that it isn't your fault for being alive. I hope you understand there isn't anything wrong with the way you are. This is your experience. This is real life.

You just spent your Saturday at the beach with your friends. It was a beautiful day. The sky was that summertime orange fade of colors you only see in movie scenes. It was honestly a great day. You're leaving the beach with your friend, driving down the road, playing music, and life is good. But these memories are eclipsed by what happens over the next hour.

At an intersection, you see flashing red and blue lights behind you. And at first, you question if they are even for you, what was going on? You nervously drive into the right most lane, it's your first time being pulled over.

You look over to your friend in the passenger seat and share a laugh because it seems like a scene taken right out of *Queen and Slim*...

In the next moment, the officer yells from his speaker PA system, "WIND DOWN ALL THE WINDOWS" followed by "PUT YOUR HANDS OUTSIDE THE WINDOW" like it's a damn hostage situation. It catches you off guard. And you feel afraid.

You turn right to the passenger and share a concerned look. In no words, you both understand: "We're in danger."

As soon as your hands come back inside, you call your mom. You let her know you're being pulled over, you're scared, and things feel *very* weird. She stays on the phone. The atmosphere is completely different, and you're tense.

You see the officer walking to the window, playing with his holster, as if he wants you to know he's armed.

When the officer comes to your window, he accuses you of a slew of things. "Do you know the speed limit?" "Do you know you were speeding?" "Are you intoxicated?"

He doesn't ask for your name or where you're going.

You reply with "No sir, I didn't know, I don't think I could have been going that fast but no sir."

You weren't detained for protesting; you were detained for driving while Black.

He then tells you to get out of the car. *What? What for? What did you do?* You look over to your friend worriedly then get out the car.

You're guilty until proven innocent.

The officer tells you to put your hands on top of the car, and the officer pats you down. Your pockets, your legs, down to your ankles. You're very confused.

He tells you to put your hands behind your back. Time freezes for a moment because you don't really process this. You're handcuffed within a second.

The image of the Black male. Creating fear around the Black male as criminal.

Like clockwork the officer says into his radio, "black male detained." These words strike you harder than a sucker punch. You ask him why you're being detained, and he only replies with "for your safety and mine." This makes less sense the more you think about it. And you're shaken to your core.

As the officer guides you to the back of his police cruiser, he and his partner accuse you of some other exaggerated claims. You're still in cuffs.

"Why you'd pullover without using your signal?" "Sir I was nervous—" "Are you intoxicated?" "Are there any drugs in the car?" "You know we could arrest you." "Sir, I didn't do that—"

There are more Black people controlled by the prison industrial complex than were ever enslaved.

You bite your tongue because you understand your only goal is to make it out alive. In this moment, you've felt like you've already lost, like you're already guilty of things you didn't do. And it replays in your head again and again.

Door opens. You're placed inside. Door closes.

And you don't question the words "tough on crime" or "war on drugs"?

You sit in the back of the police cruiser. The space is cramped, and the weight of your body pushes the handcuffs into your wrists. They hurt. It dawns on you just how powerless you are. absolutely powerless. at their mercy.

No matter how small you felt in that moment, never let them cuff your spirit. Are you going to let them break your spirit?

These thoughts race through your head:

What did you do wrong? How would your parents get here if you really needed help? What are they doing to your friend that's still in the car? Is this really happening? How long will you be in here? What happens if they take you away? Who is going to protect you from them? What did you do? Are you going home tonight? *You really want to go home.*

Once someone is convicted and sentenced, nobody really cares about them.

How do you act? You find yourself somewhere between wanting to speak up to defend yourself from the assault of accusations and remaining "cooperative" to defend yourself from the threat of a very real death.

Time goes by. You see another cruiser pull up to the scene, then leave. Bald white officer nods then drives off.

Taking Black men away from their families, disappearing them into prisons.

The police cruiser door opens, and the officer asks for your license. Your student ID falls out of your wallet, maybe the officer sees value in your life now. You don't know. You're uncuffed and walk back to your car. You're then asked for your registration. He walks to his cruiser.

A system where being rich and guilty is better than being poor and innocent.

He comes back and says, "Oh, so your name is Brian." You can only help but squint. The officer explains he could have arrested you for something you didn't do and is doing you a favor by only giving you two tickets. His attitude is completely different from earlier. His partner explains your rights: paying, traffic school, court.

You dislike how the second officer says "rights" as he looks at you. Patronizing. You bite your tongue again.

Answer carefully. Your rights depend on it.

Have you ever been convicted of a felony? [yes] [no]

But you're only focused on one thing, making it out alive. So you leave, with only one thought in your mind: Did that really just happen?

That was my first time being pulled over. I left with two tickets and small bruises on my wrists, but the biggest wound was on my mind and spirit. It was an hour long altercation but when I exited the car, I was detained within seconds. I was in the back of the police cruiser before the officer asked me for my name, license, or registration.

For those who know me, know that I'm a few weeks into turning 19, I go to MIT, and want to do everything to uplift myself and my community, and even in the absence of all that, my life matters, but to that officer I was just another "black male detained."

That is my story. As I **lived** it. And if you ask me about it, I'll smile and say I'm fine, because I don't feel like **reliving** it. As soon as I opened the front door, my mom rushed into my arms. I got to come home that night. Some of us aren't as lucky to say the same. Remember their names...

COMMUNITY IMMUNITY

Goodbye MIT, not bye for good

My last three days at MIT helped me use all my love languages, even the one I never thought I could express

MAX YU — THE TECH

My last few days at MIT involved anything but a pset.

By Grace Chuan

When it comes to love languages, mine is certainly not words of affirmation. I don't need to hear how much someone appreciates me, and the words "I love you" don't mean as much as being held silently in someone's arms. It's because I grew up with a single parent. My father was never around to drive me to soccer practice, attend my recitals, or take me to doctor appointments. Instead he would send me daily text messages or letters through the mail about how much he's proud of me and loves me. His frequent tagline is "好宝," which roughly translates to "good child," but means "my baby." My relationship with my father is saturated with words of affirmation, to the point where they start to lose meaning. It's even more difficult to communicate to someone how I feel about them.

But during the last few days at MIT, given our limited time, my friends have given me some of the most heartfelt and touching words. Tuesday's email didn't faze me. It was only when my senior friend Darnell tried to say goodbye that I cried for the first and last time about the situation. He thanked me for being a positive light in his life and for making him laugh every time we saw each other. I know I was speechless at the time, but I just want to say to him and everyone else who expressed how much I meant to them through words, that I feel so much gratitude for having them in my life.

I didn't show it through words of affirmation, but I tried my best to show it through my primary love languages of quality time and acts of service. In other words, I just showed up.

French House, which I only moved into last semester as a junior, became super important to me. From our wine nights filled with gossip to cooking every week with my cook team, the people of French House made me feel at home. On Thursday, a friend and I bought fancy pastries from Newbury for each senior for our senior send-off. However, we miscalculated and needed one more. So during the send-off, I took a Lyft back to Newbury but ended up going to Georgetown Cupcake since the other bakery was closed. It meant a lot to me that every senior was properly recognized, so the trip was not a problem at all.

Being there for others and performing small acts of kindness became my priority other than packing. I went to the McCormick send-off even though I don't live there anymore because of the seniors I'm still friends with. I helped my friend move out of her room so her mother didn't have to enter the building. I was an outlet for people's emotional rage and confusion. Making someone's life even a little bit easier during this time of stress and hardship was all I needed to do before going.

And I did this because, as I transitioned from swimming with my head in the water to floating back up to the surface, I realized that everything I have done and learned at MIT is inspired by the people and community surrounding me. Like a voice part in a choir. The key to harmony is when one person's instrument is supported and strengthened by everyone else's. Not only did the people of MIT simply make me happy, but they taught me how to be vulnerable, curious and ambitious, a cultivated and balanced human being in an academic environment that can be absolutely grueling.

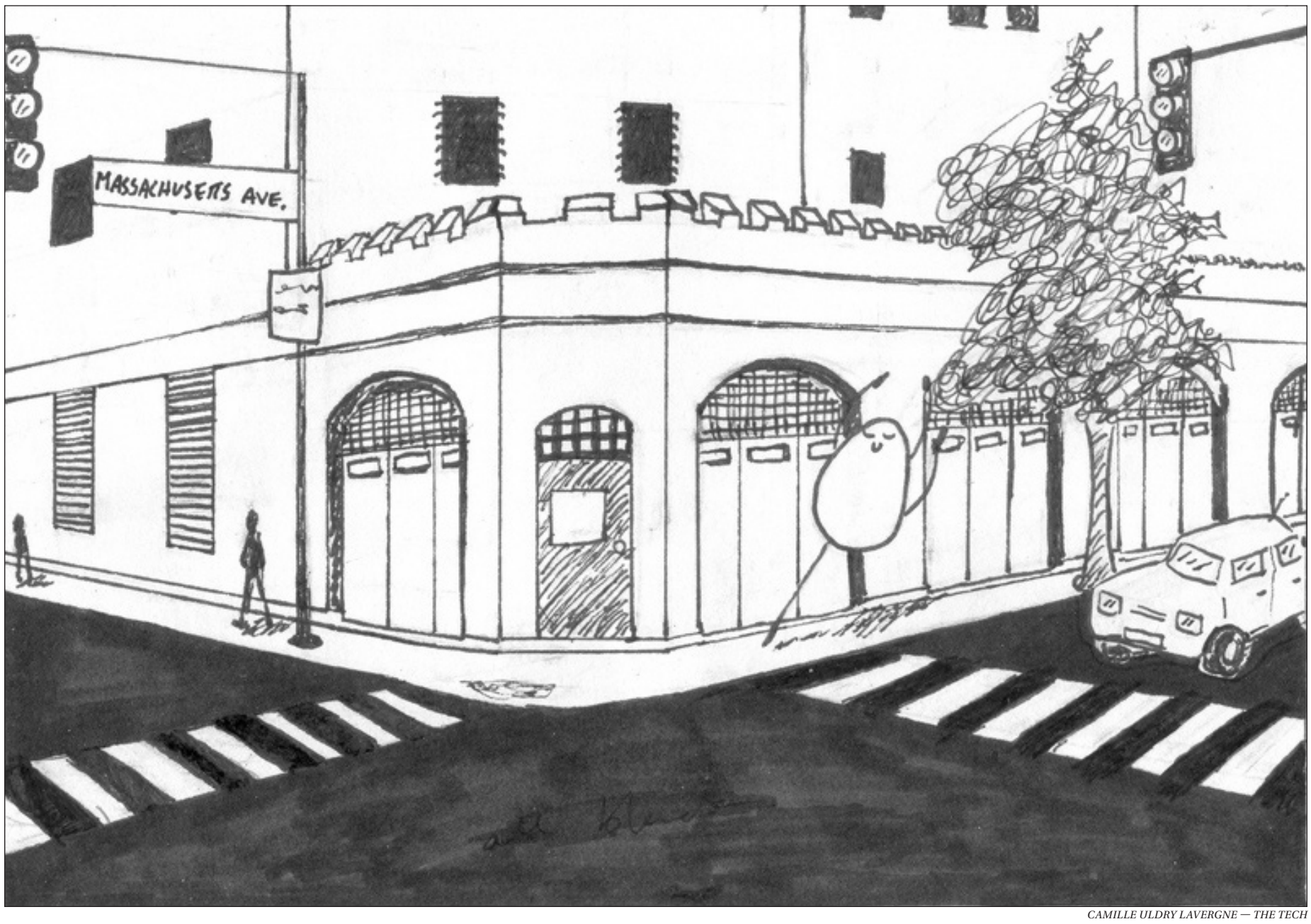
Darnell told me that this ordeal really showed people's true colors, that MIT is truly about people over psets. So yes, when it comes to love, I'm bad at words. I'm trying to improve, which is why I'm writing this love letter to you all.

CAMPUS LIFE CAMPUS LIFE CAMPUS LIFE CAMPUS LIFE CAMPUS LIFE CAMPUS LIFE

WENBO'S WALKS

Goodbye grief, hello H Mart

Grocery shopping on Mass. Ave. was more than I bargained for



CAMILLE ULDRY LAVERGNE — THE TECH

An egg dancing away its egg-conomic problems.

By Wenbo Wu
EDITOR

Massachusetts Avenue is more than a divide between East and West Campus. It's more than a street that leads to Harvard Square where all the food's at, and above all, it's more than the road work that created and continues to incessantly maintain it.

What is the illustrious Mass. Ave. truly? This question keeps me up at night (as does the road work). Lately, I've stumbled upon a revelation — or more accurately, tripped over one. Brace yourself for word-vomit.

Massachusetts Avenue is a place to wander without purpose, a prairie where my wildest thoughts can roam free, and above all, a flower of hopeful memories blossoming in my nutritious heart.

Nutritious. I meant to reference fertilizer to extend the metaphor, but I'll admit the word sounds a bit off on paper. But frankly, don't let my umami choice of adjectives distract you from the fact that Massachusetts Avenue is my life.

Why go skydiving or spelunking when all it costs to experience Mass. Ave. is nothing but my time, mind, and calories spent struggling to maintain a sane body temperature during the winter months? Never mind. Feel free to unread all that.

Yet, this is precisely why I'm putting all my eggs in this one basket of a biweekly column where I compose a stream-of-consciousness as I walk Mass. Ave. (and, unfortunately, other streets too). I want to take all of you along with me on this intellectual dumpster fi — I mean — adventure.

By the way, did I mention how beautiful eggs are? They are, whether scrambled, hard-boiled, sunny side up, poached, or in whatever way you prefer them. Actually, scratch that: hard-boiled eggs taste horrible.

Which came first, poaching the egg or poaching the illegal activity? Was one sense of the word inspired by the other, whichever came later? Are they related at all? I suppose that's a real chicken-or-the-egg kind of question. Oh man, I'm really hungry. I should buy eggs.

A warm breeze greets me as an automatic sliding door opens before me, inviting me into the enclosure within. The familiar smell of bread, of curry, of ramen, and of the meaning of life wafts into my mind and lingers like the numb aftertaste of a packet of Samyang 2X Spicy Ramen. I came to get eggs. But why?

And such is the dilemma of life. Why would I get eggs at this H Mart when they cost factors less at Target? Why am I looking for them in the *produce* aisle? Or perhaps the most important question of them all: are eggs just social constructs to hide the inequities of life? I leave you this week with that #deep question. Tune in in (I'm sorry, English is weird) two weeks to see what shenanigans I'll be up to then.

TOGETHER WHENEVER

Four ways that MIT taught me how to love

I was content with admiration from afar, until I decided to sit next to him during 7.45 lecture

By Daiyao Zhang

"I loved her, and sometimes she loved me too." — Pablo Neruda

I met my first friend at MIT, Tuyet, during CPW. Spending the weekend with her was a dream. We laughed at each other's dumb jokes and found ourselves on top of Stata at 1 a.m. We promised to stay in touch, but I kept my expectations low. We both had more than 1,000 other people to get to know. She became my roommate in the fall. We were like sisters. I thought I knew her like the back of my hand, but the intensity of freshman year meant that I didn't really even know myself yet. The way I hurt her was like the way we wear our shoes. Your feet dig into the soles until the heels have holes you can no longer fix. Taking time away from each other in order to understand ourselves better was ultimately what saved our friendship. We're in a better place now, and I think we'll be friends for life.

"A man who dares to waste one hour of time has not discovered the value of life." — Charles Darwin

I started my UROP during the January term of my first year, and it quickly became the most important part of my life. I cultured colorectal cancer organoids for targeted drug testing 70 hours a week, and I never felt more passionate about a singular subject. I'm not sure if my drive was derived from the contagious curious energy that my mentors passed on to me, or the novelty of the beauty I discovered while staring down a microscope to view the building blocks of life. I knew that I wanted to accomplish something in this space, and the feeling was something I had never experienced before. Like so many other MIT students, I packed my schedule in seemingly impossible ways and traded time with friends and meals for more time in the lab. I continued down this path for 1.5 years before I finally felt like I was banging my head against a concrete wall. After taking a hiatus to study for the MCAT, I returned with a new, more balanced perspective on my time here. I've since learned to love science in a different way.

"Friends are relatives you make for yourself." — Eustace Deschamps

The beautiful thing about Course 10 is that we all sit in this room called 66-110 for all of our classes, and somewhere around sophomore year, we seem to have chosen informal assigned seats for ourselves. I spent my first chemical engineering class sitting alone near the front of the class. I didn't do this so I could interact with the professors, but so I didn't have to acknowledge other people and possibly make a fool of myself. Things changed sophomore year when I finally started talking to Jacky. Even though we didn't share classes together in the fall, we found time to spend with each other. We bonded over our shared major, but our friendship became so much more. I've always thought that I was only compatible with extroverts, but I learned that comfortable silence can be a way to prove true friendship. No one can make me laugh with fewer words. Now, I sit in the back row of 66-110 with some of the brightest people I've met, and our friendship goes far beyond that room.

"You are my sunshine."— Tee Udomlumleart

In the grand scheme of things, I've never been one to go chasing after a crush. I was content with admiration from afar until I decided to sit next to him during 7.45 lectures. I decided that admiration from a bit closer would also be nice. Asking someone out at MIT is a bit hard. Even in the off chance where the stars align and you both are completely free on a Friday night, both of you spend the silent moments where you are both chewing your Anna's burrito wondering *so do they like me or...?* You never expect unrequited love to become not-unrequited love, but sometimes things work out. At MIT, we're surrounded by more brilliant, creative, uniquely passionate people than we may ever be in our lifetimes. Give a little love to the person who lives down the hall, the random classmate sitting next to you, or the cutie you find yourself staring at when walking down the Infinite. You never know what may blossom.

SCIENCE IN REVIEW

As the student newspaper of an institution renowned for scientific research, it's apropos that *The Tech* has a Science section. Unfortunately, however, this year's science coverage has been a bit limited, perhaps due to the remote school year and reduced access to labs making the normally collaborative, in-person research activities feel especially distant. Nevertheless, it's undeniable that science plays a huge part in our lives, as we navigate a world transformed by a pandemic. This year, the Science section celebrated the work of MIT researchers finding answers to the questions of COVID-19, with pieces highlighting both the work of individual labs and the synergy of teams across institutions sharing their expertise.

In 2021, we hope the Science section can continue to recognize the efforts of scientists at MIT, as they make further improvements to our health and wellbeing, tackle the crisis of climate change, wield computational tools to solve long-standing problems, venture into the orbits of extraterrestrial objects, and contribute more pieces to our incomplete puzzle of the world.

— Kristina Chen '23
Volume 140 Editor in Chief

LAB SPOTLIGHT

Engineering nuclear policy

The Lab for Nuclear Security and Policy works at the intersection of nuclear science and policy

By Laura Schmidt-Hong
ASSOCIATE EDITOR

As much as nuclear technology and engineering are rooted in physics and radiation, reactors and weaponry, they also involve stories of politics and negotiation, history and diplomacy. The gray decades of the Cold War and today's evolving landscape of nuclear stability and international relations are inextricable from the technology that drives them. This sort of interdisciplinary symbiosis inspires Scott Kemp's work in MIT's Laboratory for Nuclear Security and Policy (LNSP).

A physicist by training, Kemp first became interested in applying politics and history to nuclear science after working in international relations and realizing the need for technical expertise in policy making. Working in the State Department as a science advisor, he noticed that "there's a tremendous amount of policy, especially in the security space, that just makes no scientific sense whatsoever." He earned his PhD in Public and International Affairs from Princeton University, where he wrote two dissertation-length analyses: one in history and one in nuclear engineering. The works were "essentially on the same topic, but from two different perspectives," he said.

Now, as an associate professor of nuclear science and engineering and director of the LNSP, Kemp brings the same interdisciplinary focus to the lab. He works alongside physicists and chemists whose combined expertise enables them to solve problems and develop strategic tools.

Since its inception six years ago, the lab's research has focused primarily on developing effective methods for treaty verification. Such verification is necessary to ensure that each nation committed to a nuclear treaty truthfully reports the number of warheads in their arsenal. Ensuring accurate self-reporting requires both political and technological approaches.

Inspired by information theory and cryptography, Kemp and Areg Danagoulian '99, professor of nuclear science and engineering, have developed direct warhead verification protocols that can, in principle, verify the authenticity of a nation's warheads while maintaining the secrecy of their design. Kemp explained that computers are rather poor tools to carry out such protocols: "all that does is put the burden of confidence on a computer system, and no one can prove that a computer does only what it's supposed to do and nothing else." Rather than using computers, they built physical systems that can apply information protection concepts. One such system is a physical implementation of a one-time pad — an encryption technique that involves a single-use key shared between two parties. This method is "the only provably secure form of encryption," said Kemp, making it uniquely useful for treaty verification. Another system, inspired by zero-knowledge proofs, returns a null result when it compares two identical objects.

The financial stakes of all these efforts are high. According to Kemp, the United States will spend over one trillion dollars over the next three decades revamping their nuclear arsenal. That spending hinges on the United States's conception of other nations' nuclear postures and doctrines.

Another necessary element of verification is reconstructing the history of nuclear weapons production programs, particularly secret ones. If one day the United States negotiates a disarmament agreement with North Korea in which it relinquishes its nuclear weapons, Kemp anticipates a new question: how can the United States know how many nuclear weapons North Korea should give up?

Analytical chemistry methods developed by the LNSP may provide the answer. In a collaboration with his colleague Michael Short PhD '10, professor of nuclear science and engineering, Kemp took advantage of the science behind alpha radiation and its effects on the microstructure of nuclear hardware. Uranium-238, the most abundant isotope of uranium found in nature, and uranium-235, the predominant isotope used in nuclear weaponry, emit alpha particles of different energies when they radioactively decay. As a result, they deposit energy at different depths, in what are known as bragg peaks, inside the materials that make up physical equipment, he said. In turn, scientists can estimate which isotopes of gaseous uranium are present in nuclear machinery by quantifying the radiation damage inside and applying conservation laws.

Kemp noted that this research manifests itself in the lab just like any other research, with one key distinction. "it's benchwork, and it's dirty... and it looks like any other lab," but "it's been selected to have this particular national security impact."

COURTESY OF MIT NUCLEAR SCIENCE AND ENGINEERING

MIT's Laboratory for Nuclear Security and Policy uses techniques like analytical chemistry and information theory to inform nuclear policy.

Ultimately, through their efforts, Kemp and Short have successfully developed a method to measure structural changes from radiation in the plastic gaskets used in nuclear plants. They are still working to apply the same approach to metal parts, whose chemistry makes them more difficult analytical targets.

The lab and its research have not been immune to recent changes in the politics of nuclear technology and security, however. Kemp had a hand in developing the Iran nuclear deal, through consultations with the State Department and meetings with Iranian officials. When the United States withdrew from the deal and Trump launched a dialogue with North Korea, the LNSP began exploring ways to bring North Korea "into the fold," Kemp said. In particular, he hopes to develop cooperative opportunities to increase the safety of North Korean reactors, manage its nuclear waste disposal, and use these efforts as a first step in building trust, he said.

Down the road, Kemp envisions the lab similarly extending its focus beyond nuclear security to "any kind of role technology might have" in existential security.

As they begin to explore the security considerations of decarbonization technologies, for instance, energy policy has captured Kemp and the department of nuclear science's interest. In seeking the "optimal path to decarbonizing the electricity sector," they hope to determine whether decarbonization technologies create or solve security problems. According to Kemp, vulnerabilities in the United States' electric grid can be secured with improved planning of how new generation and transmission technologies are deployed.

Through the lab's current and future work, Kemp ultimately hopes to maintain the interdisciplinary lines of thinking that have always inspired his and the LNSP's research. "In an era where technology has, in a sense, outpaced our morality," he said, it is necessary to understand that the "ability to use technology for good or for evil is so powerful that we need institutions and policies to deal with it."

In the long run, said Kemp, "if you want to use technology to effect positive change in the world, you first need to be equipped with the skills to understand how the world works."

LAB SPOTLIGHT

Fighting coronavirus through research

The Gehrke Lab's work on viruses and their involvement in COVID-19 research

By Seung Hyeon Shim
STAFF WRITER

With millions of patients affected by COVID-19, a novel coronavirus likely transmitted initially by bats, Lee Gehrke, biology professor and faculty at the Institute for Medical Engineering and Science, is investigating potential diagnostic tools and treatments as a response to the world's pandemic crisis.

As a virologist, Gehrke explores the pathogenesis and progression of viruses. Previously, the Gehrke Lab developed rapid diagnostic tools for both the dengue and Zika virus, which are types of flavivirus. Now, the lab has extended its scope of research to discover rapid diagnostic tools for COVID-19, utilizing past pathogenesis techniques for the dengue and Zika viruses.

Although flaviviruses and coronaviruses are from different viral families, they are both positive, single-stranded RNA viruses that can translate proteins directly from their RNA genome. Generally, coronaviruses are more dangerous than flaviviruses because the "SARS-CoV-2 [severe acute respiratory syndrome coronavirus 2] virus is transmissible through aerosol droplets, through person-to-person contact, and potentially through contact with contaminated surfaces. Because the world's population had not been exposed previously to the newly emergent SARS-CoV-2 virus, there was no prior immunity to it," said Gehrke.

He also explained that "flaviviruses have a genome that is about 10,000 to 11,000 nucleotide bases while the coronavirus genome is larger, at about 30,000 nucleotide bases. In addition to being larger, the SARS-CoV-2 coronavirus has a more complex replication strategy than the flaviviruses." Rather than synthesizing continuous RNA transcripts, coronaviruses generate small, segmented RNAs that make the viruses' pathogenesis harder to study.

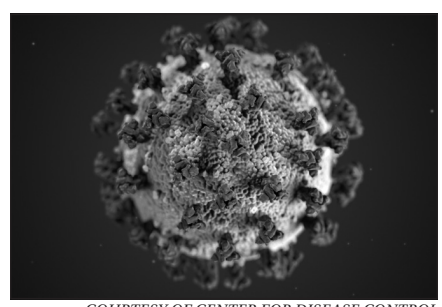
As one of the few labs authorized to conduct research on biosafety level three (BSL-3) viruses, the Gehrke Lab is studying pathologies of SARS-CoV-2 at the Ragon Institute. Employing virology techniques such as titer determination — analyzing the number of infectious particles present per unit volume — the Gehrke Lab is applying their expertise in flavivirus to study the novel coronavirus.

Similar to studying flavivirus, Gehrke and his lab members are closely mirroring human physiology in their research, as well as using other methods, such as microscopy imaging and cytokine analysis. Through these established research methods, Gehrke is hopeful that they will be able to yield a quicker result.

In addition to other diagnostic techniques — including nucleic acid and PCR methods — the Gehrke Lab has developed a direct viral antigen test, lateral flow chromatography, which "detects the virus itself using antibodies that recognize the viral particles." Believing that this technique has high potential, Gehrke and his lab aim to make it available to the public, including places that do not have a lot of resources and power, so that people can self-diagnose quickly, periodically, and simply.

Because SARS-CoV-2 is a BSL-3 agent, greater challenges arise than when conducting ordinary research. In order to prevent potential inhalation of any infectious materials, Gehrke described safety measures being implemented: "Conducting experimental work at Biosafety Level 3 is challenging because researchers work in a full-body Tyvek suit with several pairs of gloves. The head is protected

COVID-19, Page R8



COURTESY OF CENTER FOR DISEASE CONTROL

The Gehrke Lab is working to develop diagnostic and treatment tools for COVID-19, the novel coronavirus

SCIENCE SCIENCE SCIENCE

SCIENCE FEATURE

Scientific collaboration in the era of COVID-19

Researchers across MIT and neighboring institutions tackle COVID-19

By Laura Schmidt-Hong
ASSOCIATE EDITOR

As the COVID-19 pandemic continues its spread, the same questions that were raised at its emergence continue to be asked, with both hope and concern: When will a vaccine be developed? How can tests for both infection and immunity be widely administered? Why the broad range in individuals' presentation of symptoms? In short — when will scientists know all the answers?

Researchers across MIT, working alongside scientists and clinicians from neighboring institutions and hospitals, are making broad and collaborative efforts to address these questions. Coming from a range of backgrounds — some virologists by training, others biophysicists — they are all applying their unique skill sets to tackle a single, unifying topic: SARS-CoV-2, the virus behind COVID-19.

Yet this scientific challenge is unique not only in the collaborative nature of the research being conducted, but also in its urgency and the pace of investigators' efforts. With Dr. Anthony Fauci, director of the National Institute of Allergy and Infectious Diseases, estimating an unprecedentedly short 12-to-18-month timeline for vaccine development, and the parallel push for diagnostics and basic research, the scientific community is operating with unprecedented speed and intensity.

Alex Shalek, associate professor of chemistry and associate member of the Ragon Institute of MGH, MIT, and Harvard, is one of many MIT researchers tackling this challenge. His research group studies the dynamics of cellular communities, exploring how their composition and communication drive tissue-level properties. With expertise in host-pathogen interactions and immunology, the Shalek Lab was primed and ready to explore the pathogenesis of COVID-19.

In late April, a team from his lab and the Human Cell Atlas Lung Biological Network published a study in Cell examining the likely cellular targets of SARS-CoV-2. Using single-cell RNA sequencing (scRNAseq) data, the researchers identified specific cell types that co-express the genes for *ACE2* — angiotensin-converting enzyme 2, the cell surface receptor to which SARS-CoV-2's spike protein binds — and *TMPRSS2* — an enzyme also involved in viral entry.

Shalek explained that scRNAseq relies on each mRNA transcript in a cell possessing a polyadenylated tail — a string of adenine nucleotides — which can uniformly and efficiently be captured using a common probe. Many viruses also contain polyadenylated stretches in their genome, allowing researchers to co-detect viral nucleic acids in host cells and, in turn, identify the cellular properties associated with high viral loads. The researchers discovered a striking association: *ACE2* is an interferon-stimulated gene in certain human cells, meaning that SARS-CoV-2 may exploit the upregulation of *ACE2* in response to interferons, a family of proteins typically released during antiviral responses.

Notably, all of the results revealed in the study came from data sets "created for completely different biological questions," said Carly Zeigler, a graduate student in the Shalek Lab and the lead author of the paper. Because genomics technology can measure the expression of all the genetic material in a subject's cell, researchers in the Shalek lab were able to quickly reanalyze data from past studies to study *ACE2* and *TMPRSS2*. "This project was really enabled by a ton of data we could repurpose from other diseases and research questions that we were already working on," Zeigler said.

The publication process for this paper was unique in many ways, Shalek added. The authors' ability to conduct follow-up experiments and collect data in response to reviewer comments was unusually restricted, he said. As a result, they made an effort to be transparent with the limitations of the paper and "put things out with all the appropriate caveats."

Researchers' overarching priorities during the pandemic have also shifted from the norm, Shalek noted: "This has been a time where our main focus is not on writing papers," he said, "but rather our goal is to rapidly generate essential data and share it with the public."

Shalek's is not the only lab at the Ragon Institute rapidly applying existing data and methodologies to study COVID-19. Bruce Walker, the founding director of the Ragon and a leader in the study of HIV infection, noted that "it's been quite remarkable that what we've been doing related to HIV has been so directly applicable to this pandemic, and that we've been able to take platforms we have and immediately pivot them to work on this new virus."

According to Walker, researchers across the Ragon have begun a whole array of COVID-19 research projects, with a particular emphasis on vaccines and diagnostics. Dan Barouch, a founding member of the Ragon, is developing a vaccine using genetic vectors taken from adenoviruses with inserts of the gene coding for SARS-CoV-2's spike protein. The vaccine has already been shown to reduce viral loads in monkeys and is expected to enter clinical trials this fall. Its rapid pace of development was made possible by the Ragon's existing HIV vaccine platform, Walker noted. Other researchers at the Ragon, including Harvard Professor of Biology Aaron Schmidt, are working to develop recombinant viral proteins that can be used in antibody detection assays to test for prior infection.

In an effort to bring together the expertise of not only the Ragon's Harvard, MIT, and MGH researchers, but also investigators at neighboring institutions and hospitals, Walker co-founded the Massachusetts Consortium on Pathogen Readiness (MassCPR) alongside Arlene Sharpe, department chair of immunology at Harvard Medical School. With scientists from institutions across the state — many from MIT — the consortium has proven "really transformational in terms of the collaborations that it's facilitated and the synergy that it's created by getting people from different areas to bring their ideas and perspectives to the table," said Walker. As of mid-May, the MassCPR had donated over $16.5 million to COVID-19 research projects, including many led by MIT researchers such as Lee Gehrke and Feng Zhang.

"Science in a lot of places is very siloed," Shalek noted. "MIT's a particularly collaborative place and we're a particularly collaborative lab, but this has been something where many scientists around the world have really turned out to try and tackle coronavirus together, and you see an incredible groundswell of excitement around this with people actively trying to figure out how they can help."

Efforts by MIT researchers to study COVID-19 extend even beyond the broad efforts by researchers in the MassCPR and Ragon. Katharina Ribbeck, assistant professor of bioengineering, recently received a grant from the National Science Foundation (NSF), using their Rapid Response Research (RAPID) funding mechanism, to explore the biochemical role of mucus polymers in SARS-CoV-2 entry.

"Mucus was long considered to be mainly a physical barrier that prevents access of microbes to the underlying epithelium," said Ribbeck, "but now a different picture is emerging… that the barrier is really highly active and directly interacts with and actually regulates microbial behavior and physiology."

Ribbeck's lab specializes in the study of mucins, bottle-brush-shaped polymers found in mucus that display a broad assortment of complex sugars known as glycans, which can interact with immunological factors and pathogens. Several viruses associate with and infect the epithelium by binding to sugar molecules on receptors displayed on the epithelium, she explained. For certain viruses, "this binding to sugar molecules can be prevented or suppressed in part by mucin polymers, which display molecules with similar chemical makeup at a further distance from the epithelium," in turn acting as "decoys."

Using her lab's NSF RAPID funding, Ribbeck now hopes to identify the role of mucus in COVID-19 pathogenesis, as well as the mechanisms by which SARS-CoV-2 binds to and transports through mucus. Her lab is also interested in exploring biochemical differences between severely symptomatic and asymptomatic patients, to better understand the mechanisms behind the variation in COVID-19 disease presentation.

The Shalek Lab is similarly interested in exploring differences in disease severity, recently having begun a collaboration with Boston Children's Hospital researcher and former lab postdoc José Ordovas-Montanes to compare disease pathogenesis in pediatric and adult cohorts.

Again and again, the investigators involved in COVID-19 research remarked on the collaborative spirit and drive present across all of the scientific community.

Because "there are so many people coming from so many backgrounds… to tackle this problem," Shalek said, "you're able to do these things on timescales that you would've never imagined before." He noted that, in the process of publishing his lab's *Cell* paper, many of the final pieces of data included in the manuscript came from scientists across the globe; for instance, their collaborators in France contributed to protein analysis on tissue extracts.

According to Walker, the Ragon Institute as a whole was originally established to counter the siloed nature of scientific research, which typically makes it "very hard to bring all scientific knowledge to bear against a specific problem." Across the Ragon and particularly in the face of the current pandemic, Walker said, "we really embrace this notion of cross-fertilization by cross-disciplinary interaction."

Researchers also emphasized the need to continue infectious disease and outbreak preparedness work even after the COVID-19 pandemic reaches its end. The MassCPR's stated mission is to not only address the crisis at hand but also to "better position the Consortium for potential future outbreaks."

Ultimately, for all of the current and future challenges and questions raised by the pandemic, "the degree of collaboration and coordination, and the openness with which the entire global scientific community is moving forward here, is truly astounding," said Shalek. "It's been amazing to see what the scientific community can do when they put their mind to it."

Many continue to study COVID

COVID-19, from Page R7

by a helmet-like covering wherein filtered air is delivered through a battery-powered positive pressure pump." Another challenge is the limited availability of human samples for efficient diagnostic testing. Therefore, Gehrke explained that despite the mass number of people infected, connections between clinics and labs aren't yet well-established to effectively test potential treatments on people.

On the bright side, Gehrke noted that the family of coronaviruses has been studied for a long time and that while researchers cannot yet "extrapolate from the pathophysiology of 2003 SARS-CoV-1 to describe 2019 SARS-CoV-2," there will be similarities to establish better foundations in their research. Moreover, to cope with the challenges of the current pandemic, the National Institute of Health, government agencies, and various consortiums are putting efforts into supplying resources. Not only are numerous researchers investigating COVID-19, but they are also better collaborating and sharing data to reduce redundancy and increase efficiency.

Countless people have been affected by the COVID-19 outbreak, whether financially, politically, socially, and academically. Fortunately, there are numerous researchers, including Gehrke and his lab members, hoping to make a difference in this time of crisis.

LAB SPOTLIGHT

Simulating galactic formation

MIT's Caterpillar Project models the formation of galaxies.

By Quinn Brodsky

For as much as astrophysicists know about the cosmos, the formation of galaxies — even the formation of our own galaxy, the Milky Way — is still an open question. This is the question that the Caterpillar Project, led in part by MIT physics faculty Anna Frebel and Mark Vogelsberger, hopes to answer. The Caterpillar Project is a suite of simulations of galaxies which, given a set of initial conditions from astronomical data (like the cosmic microwave background radiation), can give a statistical probe into the formation of thirty-five galaxies like the Milky Way.

One of the easiest ways to understand how galaxies formed is through "galactic archaeology": looking at the oldest, faintest galaxies in the universe. These are known as ultra-faint dwarf galaxies (UFD). "It's similar to traditional archaeology that uses fossils to study previous societies and learn how they evolved," says PhD student Kaley Brauer, who focuses on the Caterpillar Project's simulations of stellar halos. "We look at old stars with different kinematic and chemical signatures and by studying them, see if we can determine how they got there and how our galaxy became as it is today."

UFDs are the fossils of the universe, inactive since the reionization of the universe billions of years ago when stars released their energy, ionizing hydrogen in the universe. Because of this, they allow researchers to look into the past; the UFDs which survive today have looked the same for most of the universe's history.

Astrophysicists have learned that larger galaxies like our own are formed from the merging of smaller galaxies like UFDs. The way this happens is by "hierarchical formation," where gravitational interactions cause smaller galaxies to collapse into each other and merge into larger ones. This fact implies that, to understand the formation of larger galaxies, the first step is to understand the formation of the smaller ones.

The Caterpillar Project is made to simulate the formation of a large number of Milky Way-like galaxies at a high resolution from a statistical standpoint. The Caterpillar Project aims to understand galaxy formations by using dark-matter-only simulations. That is, the simulations ignore interactions between baryonic matter — only around ten percent of the universe which consists of matter like quarks, electrons, protons, neutrons, etc. — and only focuses on the effects due to dark matter.

To include baryonic physics would be quite computationally difficult, but since baryonic matter makes up so little of the universe relative to the dark matter content, baryonic interactions can be ignored to a very good approximation.

Historically, dark-matter simulations, like the Millennium Simulation Project out of the Max Planck Institute for Astrophysics, have shown the power of dark-matter-only simulations, demonstrating that this simple approximation — excluding baryonic physics — opens a lot of computational doors for researchers.

Other galaxy simulations, like the FIRE and Latte simulations (from a collaboration with Northwestern, Caltech, UC San Diego, and UC Berkeley) or the Illustris simulation (created by MIT's own Mark Vogelsberger), have been able to include both baryonic interactions and dark matter interactions, but these simulations typically have a lower resolution compared to dark-matter-only simulations like the Caterpillar Project.

The high-resolution, high-statistics approach from the simulation side is advantageous when it comes to comparing with actual data. "It just so happens that in the last few years, and in the few years coming up, astronomers are collecting an absolutely astronomical amount of data on stars in our galaxy," Brauer says. "Their kinematics, their spectra, and so now this is a big data/statistical problem."

The Caterpillar Project's statistically-driven simulations are well-suited for comparing to this kind of data. Brauer hopes to

Galaxy, Page R9

The project's next challenge is tracking where elements go to form galaxies

Galaxy, from Page R8

reach new insights through these comparisons, either affirming or contradictory: "It will be useful to see both similarities that we find between the simulated halos and the Milky Way, and if any differences arise, why they appear to be different."

However, the assumption that there is no baryonic matter in the universe is simply wrong. Researchers have to patch up the simplifications using various correction methods; for example, one can relate the number of stars to the amount of dark matter in the area. But with only a few corrections, the predictions made by the Caterpillar Project have proved very useful. For instance, by studying the stellar halo of galaxies simulated in the Caterpillar Project — stars and other matter that accrete on the outskirts of a galaxy — one can directly compare detailed information like chemical compositions, stellar spectra, and the kinematics of the simulated halos to actual data.

The group has found recent success in simulating the rapid neutron capture process (R-process), the process by which heavy elements are formed. When they produced stars in the early period of the universe's existence, UFDs likely produced stars with heavy elements like gold or platinum, which use the R-process. This has the potential to provide a chemical signature tag for galaxies which use this process, which could give a recipe for the formation of the Milky Way.

The Caterpillar Project's biggest upcoming challenge is tracking the step-by-step formation of stars and supernovae to track exactly where the elements go to form the galaxies. This is called "galactic chemical evolution," and the group hopes to finish this within the next year or so. Of course, the biggest step in improving the simulations is to finally include baryonic physics to fully simulate how our universe works. This requires not only computational power, but also using clever approximations to make these simulations feasible.

The members of the Caterpillar Project feel confident in its potential. "Among the people in the world who could do this work, we may be the ones that are the most pre

pared to do it," says Brauer, who thinks that the group is close to "being able to say how many small galaxies merged to form the Milky Way with any level of confidence." All eyes are on the Caterpillar Project as a leader in the world of galactic simulations.

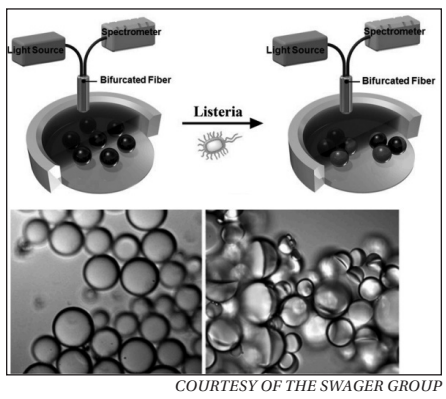
LAB SPOTLIGHT

Biosensing with fluorescent emulsions

The Swager Group combines principles of organic chemistry and materials science to produce innovative solutions for detecting foodborne pathogens

By Albert Liu
STAFF WRITER

A deadly foodborne bacteria, *Listeria* is one of the leading causes of food poisoning deaths via its namesake disease, listeriosis. Able to live through high levels of stress, *Listeria* is one of the pathogens frequently screened for in foods. However, current methods for screening are costly and require at least one day to grow cultures, a timeline that is often impractical for public safety. With such limitations, a new method for detecting *Listeria* is needed, a problem that the Swager Group at MIT Chemistry has tackled using a combination of materials science and traditional biosensing.



COURTESY OF THE SWAGER GROUP

The double-sided Janus droplets play a significant role in the Swager lab's work detecting *Listeria* more efficiently.

In order to detect pathogens, the Swager Group utilized a microparticle known as Janus droplets. Aptly named after the two-faced god in Roman mythology, Janus droplets are emulsions with two sides composed of different materials. Just as oil and water don't mix, Janus droplets are made of organic hydrocarbons on one side and fluorocarbons on the other, held together by careful adjustments of the surface tension of the liquids. The droplets are dispersed in water containing surfactants and naturally orient themselves by density. Fluorocarbons are similar in structure to hydrocarbons, except with many of the hydrogens replaced with the heavier fluorine, so the lower side of the droplets naturally consists of fluorocarbons.

For the actual biosensing aspect, researchers in the Swager lab coat one side of the droplets — the hydrocarbon face — with antibodies specific to *Listeria*. To do so, they use a burgeoning field in chemistry known as "click chemistry," which involves functionalizing two chemicals with complementary groups and allowing them to react. In this case, the Janus droplets are modified with *trans*-cyclooctene (TCO) groups, which react efficiently with tetrazines added to the antibodies. Coated with antibodies, these Janus droplets are now able to bind to *Listeria*. As multiple Janus droplets begin to surround and attach to the bacterium, a process known as agglutination, the droplets are dragged around. Since only one side of the droplet is covered by antibodies, this dragging motion causes the Janus particles to rotate, resulting in a detectable difference from above; previously only the hydrocarbon phase was visible, but the rotation exposes the fluorocarbon.

Innovative as this approach is, the technical details are challenging. In order to make the rotation of the droplets detectable, the group employs two dyes: a blocker dye to absorb incoming light and a fluorophore that absorbs and re-emits light. Kosuke Yoshinaga, a fifth-year graduate student in the Swager lab, focuses on developing the dyes for this project. He describes the two primary considerations for these dyes: their spectra (what wavelengths they absorb and emit at) and their solubility. "Very limited examples of dyes can be soluble in the fluorocarbon phase," Yoshinaga says. He adds, "You want to make something that you can manipulate with organic chemistry, but also maintain the fluorocarbon solubility, which is kind of contradictory because it's organic but kind of fluorous." In addition to solubility considerations, the two dyes must have compatible spectra; the blocking dye must not only block most incoming radiation but also absorb the emissions of the fluorophore in order to establish maximum contrast. Walking this tightrope, the group settled on subphthalocyanines for the blocking dye and a perylene bisimide for the emissive dye, which they amicably call the "Kosuke dye."

So how does this technique stack up compared to others? Jie Li, a third-year postdoctoral student in the lab, seems enthusiastic about its potential. Not only does it achieve a high level of sensitivity (100 CFU/mL), but this technique covers its predecessors' weaknesses. As Li explains, "I think our advantage in comparison with other detection methods of *Listeria* is that our whole setup is very cheap, and our detection is quick." Each sample requires only 10–20 microliters of solvent for screening, making the setup significantly more cost-friendly and scalable; meanwhile, the speed and ease of detection also is greatly improved, requiring only two hours and a one-step mixing for detection.

Despite the progress, both Yoshinaga and Li are excited for the further improvements that can be made. For the dyes, Yoshinaga is still searching for more emissive structures to enhance the detection limits. In addition, they're looking for ways to increase the stability of the droplets, such as by converting the system into solid form, which could increase the shelf life to years. Moreover, while the published work on this Janus detection system was for *Listeria*, this method is hardly limited to *Listeria*. By switching out the antibody from one to another, this system can be applied to practically any pathogen, whether bacterial or viral. With such a versatile and novel system, it's easy to sense the potential the Swager Group has in biosensing.

The Swager Group's work on the biosensing of Listeria can be found in their paper published in *PNAS*.

SCIENCE IN YOUR LIFE

For the love of broccoli

Fractals are ubiquitous in nature and mathematics

By Robert Koirala

There is broccoli at MIT's dining halls almost every week. The broccoli is usually steamed or roasted. Although I miss the garlic, ginger, oil, onions, coriander seed, chili, methi, and masala that go well with broccoli, I enjoy eating it bland. I should instead say that I love staring at its details. When broccoli is cooked well with spices, either the details get destroyed or the spices obscure the details. On the other hand, with steamed, unseasoned broccoli, I can look at its hierarchy of stalks that are self-similar at all levels and detailed heads to the point that my food gets cold.

Whoever made the first broccoli must have tried to sculpt the details at an even smaller scale to show the existence of a fractal but failed to do so because of limited time. I feel good about the creator because they never had to worry about the uniqueness part of the solution. Nevertheless, they seemed to have tried hard to prove a fractal's existence in cauliflower, Queen Anne's lace, ferns, mountains, and coastlines to no avail. Well, a physicist could argue that broccoli is close enough to be a fractal: a stalk resembles the whole broccoli. A smaller stalk resembles a bigger stalk and so on. But for a mathematician, it does not have details smaller than the leaves that look like the whole broccoli. So, it does not qualify as a rigorous fractal.

"Fractal" must be a cousin of "fracture," as fractals are broken in some sense. Consider a fractal called a middle third Cantor set. Take an interval from 0 to 1 in the real number line. Delete the middle third of the line (excluding its endpoints). We should get two lines: one from 0 to 1/3 and the other from 2/3 to 1. With each of these lines, delete their middle third and continue the process forever. What is left after this iteration is the Cantor set. It is fractal because of its self-similarity at all levels. And it is constructed by breaking lines. However, not all fractals are broken.

Fractal could be a foe of "fair," since they are rough. Even the close-enough fractal, broccoli, is rough. If you have taken 18.100B (Real Analysis), you must know about the nowhere-differentiable function. For those who don't, when you zoom in enough on a differentiable function, say x squared at any point, you will start to see a straight line. But for a nowhere differentiable function, the function always has some roughness and a straight line never appears if you keep zooming in. In fact, the zoomed portion always has details that resemble the whole function. The complex details account for the roughness.

Fractal should be a mutant of "fraction," as fractals have "fractional" dimensions. Take a square whose sides are a unit length. It is made up of 2^2 squares with sides of 1/2 length. On another note, it is also made up of 4^2 squares with sides of 1/4 length. Similarly, a cube whose sides are a unit length is made up of 2^3 cubes of sides of 1/2 length. Or we could also say it is made up of 4^3 cubes with sides of 1/4 length. Note that the exponents in both cases carry the information of the dimension of objects.

Mathematically, suppose a set is composed of n sets that are a scaled down (by r units) version of the original set. Then the dimension of the set is $d = \ln(n) / \ln(r)$. Now consider the Cantor set. The essence of the construction of the Cantor set is in taking out the middle third of lines. Therefore, the points that we get after a deletion procedure starting with [0, 1] are similar to those starting with [0, 1/3] and [2/3, 1]. So, the new Cantor set consists of two copies of a scaled down (by three units) version of the original Cantor set. Therefore, its dimension has to be $\ln(2) / \ln(3) \approx 0.63$ which is definitely not an integer.

As of now, you might be thinking that fractals are akin to "fiction." They sound like mathematical fiction. After all, the examples in the real world that I gave are definitely not fractals because they are not infinitely broken and self-similar. Nor do they have fractional dimensions. Nevertheless, the creator of broccoli was successful in creating other fractals in the real world. It took an MIT physicist, Ed Lorenz, and an MIT computer scientist, Ellen Fetter, to figure out that the equation that models the convection of atmosphere can have fractals. Further, fractals occur in chemical reactions and in population modeling (such as in the logistic map). Fractals are not fiction, so fractals must have an affair with "factual."

Actually, fractal has traits of "frenzy," as they usually appear in a chaotic environment. In the model that Ed Lorenz studied, fractals appear when the convection is chaotic. Even in a chemical reaction, the fractals appear in a chaotic reaction.

I am certain that fractal is a forebear of "fabulous." "Freakish" sounds closer to fractal, though. Regardless, fractals are so fantastic that I have fun staring at them.

They have a rich underlying mathematical beauty. The weird fractional dimension and self-similarity are only some aspects of it. One can do a whole lot of analysis on fractals. For instance, one can define a Laplacian on it. Recall that the standard Laplacian is used in modeling the heat equation. In a loose sense, it models the evolution of the temperature of a solid. The Laplacian involves two derivatives, and derivatives are defined on a smooth domain. But fractals as we have seen are not smooth. So, it takes some effort to define Laplacian. After we develop a Laplacian, we can model how the temperature of a hot fractal will evolve. One could also generalize the ideas like the uncertainty principle to fractals.

I get excited about all these things just by looking at the close-enough fractal, broccoli. More specifically, bland broccoli. Thus, I would like to thank the chefs at MIT's dining halls for not adding any spices to broccoli.

SCIENCE SCIENCE SCIENCE

NEWS IN REVIEW

It is tempting to view 2020 as a progression of events, both at MIT and in the world at large. We had the inauspicious start (the arrival of the novel coronavirus followed by MIT's decision to evacuate campus); the troubling middle (the difficult conversations surrounding systemic racism and MIT's complicity as an institution); and the unsatisfying end (the disconnect of online classes and the turmoil of the U.S. political landscape). Above all, MIT students struggled to make sense of our obligations, both to ourselves and to society amid the chaos.

This view is convenient for our timeline, but it fails to capture how this year has felt, how the days melted into each other, disappeared, froze, and rushed at us with a never-ending stream of deadlines and emails, while we had to pretend everything was normal. In truth, no timeline can capture the apocalyptic peripeteia of partying on Killian Court after being told we had five days to pack our bags in March. No timeline can capture our collective Zoom fatigue or the pain of losing a year and a half of the college experience we expected when we walked down the Infinite for the first time.

Most importantly, nothing will ever replace those we lost from the pandemic, and nothing comes close to describing that grief. Despite the often-overwhelming isolation of the past year and the heavy-heartedness with which we pen these words, the strength and resilience of the MIT community have shown us hope.

The BusyBeavers and CP★ Discord servers as well as events like virtual talent shows and the Get Out the Vote Festival demonstrated the student body's determination to maintain a community, despite the physical distance the pandemic has placed between us. The powerful advocacy of groups such as the Undergraduate Association, the Graduate Student Council, the Black Students' Union and Black Graduate Student Association, and the First-Generation/Low-Income community has shaped conversations about equity and access in the community. In June, students organized a Black Lives Matter protest on the steps of Lobby 7, and departments and labs participated in #ShutDownSTEM to protest police brutality against Black Americans. In October, MIT celebrated Indigenous Peoples' Day for the first time. An Institute-wide Diversity, Equity, and Inclusion strategic action plan is set to be launched in May 2021.

Yet, there is no tidy moral lesson to be drawn from the calendar. It will take collective effort and action to ensure that our discussions about race, privilege, and inequality do not end with the protests of May and June but continue for years to come. Although students and administrators have worked together to improve financial aid policies, dining, and policies for accepting donations from outside sources, the theme of the past year has not always been institutional unity.

At MIT, Burton Conner has been taken offline, and students will move into New Vassar this spring. Clothing optionality, an irreplaceable aspect of East side dorm culture, has been restricted. Student reception of MIT's handling of the virtual academic year has been mixed. Graduate students continue to demand stronger advocates within their departments. On a larger scale, many of the traditional institutions that MIT graduates work in — government, corporations, academia — have faced significant internal conflict and external scrutiny.

As MIT students, we must continue to confront our responsibilities and roles within both the Institute and these larger establishments while we push for the changes we hope to see. Angela Davis said in a discussion with the MIT community in October that "whatever one is doing, wherever one happens to be situated, there are possibilities of contributing to struggles for equality and justice." At *The Tech*, we hope our reporting helps propel these struggles forward.

— Kerri Lu '23 and Wenbo Wu '23
Volume 140 News Editors

COVID-19 REMOTE DEI

March 2020

10 Students sent home
Due to the COVID-19 pandemic, President L. Rafael Reif announced that undergraduate students would move off campus and transition to fully-online instruction.

14 Class of 2024 admitted
The overall admissions rate rose from 6.6% to 7.3% for the Class of 2024.

17 University presidents vs. COVID-19
Reif, Harvard President Lawrence S. Bacow '72, and Stanford President Marc Tessier-Lavigne called for closing bars, restaurants and schools as well as "self-discipline of social distancing" to slow down the spread of the coronavirus.

20 MISTI canceled
MIT International Science and Technology Initiatives' faculty directors suspended their programs "on a region-by-region basis."

24 Online Commencement
Reif announced that Commencement will be virtual for the Class of 2020. The Commencement Transition Committee will plan for the in-person celebration "to be held at MIT at some point in the future."

April 2020

3 COVID-19 testing
MIT Medical Director Cecilia Stuopis '90 announced that optional COVID-19 testing will be offered for students remaining on campus.

17 CP★
MIT organized a virtualized version of Campus Preview Weekend for admitted students running April 17– 30.

July 2020

1 MIT commits to DEI plan
Reif announced that Institute Community and Equity Officer John Dozier and Associate Provost Tim Jamison will lead an effort to create an Institute-wide diversity, equity, and inclusion plan, including input from the MIT community, including the Black Students' Union and Black Graduate Student Association. The Provost's Office contributes $1 million toward anti-racist research at MIT.

7 Seniors invited to campus for Fall 2020
Seniors and students experiencing hardship were invited to return to campus for Fall 2020. Undergraduates received a $5,000 COVID-era grant and may request a loaner iPad for the upcoming school year.

8-14 DHS and ICE lawsuit
MIT and Harvard sued the U.S. Department of Homeland Security and Immigration and Customs Enforcement after an ICE directive prohibited international students with F-1 visas from staying in the U.S. unless they take an in-person class. Over 60 universities filed amicus briefs, and 18 states filed a lawsuit against the policy directive. ICE and DHS rescinded the directive July 14.

13 SAT/ACT requirement suspended
Like peer schools, MIT made SAT/ACT optional for the 2020-2021 undergraduate admissions cycle after the College Board and ACT announced disruptions to testing due to COVID-19.
FLI students
Following discussions with members of the First-generation/Low-Income community, MIT administrators revised their policies for the $5,000 COVID-era grant to give students who owe MIT less than $5,000 the remainder of the grant after their balance is cleared.

15 UA establishes diversity council
The Council "will work closely with the Institute Community & Equity Office to elevate the DEI needs of undergraduate students through policy, statements, and recommendations."

30 Fall building assignments
Approximately 900 undergraduates, of which 700 are seniors, lived on campus in the fall. All undergraduate dorms except BC were open.

August 2020

17 A, B, C, D/NE, F/NE
MIT announced letter grading for non-first years in the fall term, with NE grades not appearing on students' external transcripts. Students could opt to have one subject graded as PE/NE before Drop Date.

6 ASEs and Proctortrack
The 6.0001, 7.012, 8.01, 8.02, 8.03, 8.04, 18.01, and 18.02 Advanced Standing Exams and math diagnostic were offered prior to orientation week using Proctortrack, a software capable of monitoring student computer activity and flagging suspicious behavior. The 5.111 and 5.12 ASEs were canceled.

10 Emergency Academic Regulations
The Fall 2020 Emergency Academic Regulations stated that instructors must provide students with a "statement of required work" early in the semester. Instructors were also encouraged to "de-emphasize" final exams and discouraged from using third-party online proctoring.

18 COVID-19 testing lines
Some MIT community members spent over two hours waiting in line to receive COVID-19 tests at MIT Medical after being notified on their COVID Pass app that they would need to be tested within 24 hours or have their access to campus revoked.

29 Q-Week
Chancellor Cindy Barnhart PhD '88, Vice Chancellor Ian Waitz, and Vice President and Dean for Student Life Suzy Nelson announced that undergraduate students living on campus in Fall 2020 will participate in a mandatory Quarantine Week Aug. 29–Sept. 7.

November 2020

2 Three classes invited back
All first years, sophomores, and juniors invited to return to campus for the spring semester, while most FSILGs will remain closed.

10 MIT COVID-19 cases rise
Several of the cases were concentrated at the Sloan School of Management as a result of "exposure away from campus."

11 DEI initiatives launch
The initiatives will examine the various identities of MIT members, addressing challenges of equity and disparities in outcome, and engagement to help understand each other's differences.

16 IAP 2021 grading
Students were graded on an A, B, C, D/NE, F/NE system without an option to designate a subject graded on PE/NE.

30 Spring 2021 grading
Students are to be graded on an A, B, C, D/NE, F/NE system with the exception of first years. Junior-Senior and Graduate P/D/F options will be available.

December 2020

19 Low acceptance rate
MIT reached a record low Early Action acceptance rate of 4.8%.

22 New Media Lab head
Apollo Program Professor of Astronautics Dava Newman SM '89, SM '89, PhD '92 named director following the resignation of former director Joi Ito over Epstein relations 15 months ago.

January 2020

27 **EC security increased**
East Campus planned to implement additional security measures such as "tap pads on hall doors" after a series of intruder incidents.

February 2020

4 **Seth Lloyd's appointment suspended**
Lloyd can no longer "supervise new graduate students, attend Departmental events or serve on Departmental committees."

20 **Meal plan commitments increase**
Meal plan commitment increase planned to start with Class of 2024, while dining dollars will become optional for all students.

27 **NV floor plans released**
New Vassar features cooking pods, a grocery market, a social courtyard, and plenty of spaces for students to relax and study.

May 2020

4 **Transition to Canvas**
MIT announced its transition from Stellar and Learning Modules to Canvas starting Fall 2020. Dean for Digital Learning Krishna Rajagopal wrote that Canvas allows the integration of "a dynamic mix of technologies," such as Zoom, Gradescope, and Piazza.

12 **Jason Ku**
EECS lecturer Jason Ku '09, PhD '16 left MIT after nearly 15 years at the Institute to join the faculty at the National University of Singapore starting Fall 2020.

2 **UA Election Results**
The Undergraduate Association announced that Danielle Geathers '22 and Yu Jing Chen '22 will serve as president and vice president for the upcoming year.

20 **Graduate students return**
Graduate students returder to campus for the upcoming year, which will have graduate student residences reduced to 85% density.

29 **Virtual commencement**
The Class of 2020 Commencement took place through a three-hour live webcast streamed on the commencement website.

June 2020

2 **Community vigil**
The MIT community held an online vigil in wake of the recent killings of Black Americans across the United States.

6 **BLM demonstration**
About 100 MIT community members held a peaceful two-hour Black Lives Matter demonstration on the steps outside Lobby 7.

10 **#ShutDownSTEM**
MIT departments and labs participated in #ShutDownSTEM and #ShutDownAcademia. Non-Black researchers and professors organized strikes and held discussions about racism to protest systemic anti-Black racism in academia.

28 **Seniors petition for campus access**
Over 400 students signed the 2021 Class Council's petition for seniors to have physical access to campus for the upcoming school year, citing hands-on research, lab classes, and community-building.

September 2020

1 **New Dean of Science**
Nergis Mavalvala PhD '97 became the first woman and LGBTQ+ Dean of Science at MIT.

9 **Dining ramp-up**
MIT Campus Dining provided service at nine undergraduate dorms and the Stratton Student Center during Fall 2020. On-campus undergraduates were required to enroll in a 14-meals-per-week plan featuring the same menu at all locations.

18 **Joe Biden endorsement**
24 Turing Award winners, including 5 MIT professors, endorsed Joe Biden for U.S. President, stating that "Biden and Kamala Harris listen to experts before setting public policy."

21 **Virtual career fair**
MIT Fall career fair was held virtually as a Career Exploration Week and a series of six smaller career fair sessions throughout September and October.

22 **Sergio Dominguez (1997-2020)**
Dominguez majored in 6-9 and was a Gates Millennium Scholar who "loved to learn."

October 2020

6 **Physics Nobel Prize**
Andrea Ghez '87 received the prize jointly "for the discovery of a supermassive compact object at the centre of our galaxy." She is the 38th MIT alumnus to receive a Nobel Prize.

2 **Executive Vice President and Treasurer**
Glen Shor was named EVPT after Israel Ruiz SM '01 stepped down from the position at the end of the spring semester.

26 **GSC opposes DHS proposal**
The Graduate Student Council joined 59 other student governments in a statement calling on the DHS to "rescind this proposed rule and consider the impacts that even suggesting such a rule can have on international scholars' view" of the U.S.

28 **Spring 2021 delayed**
The first day of Spring 2021 classes was pushed to Feb. 16; in addition, the week-long spring break was replaced by three- and four-day weekends.

22 **NV to open January 2021**
BC will undergo renovations starting in January 2021, while New Vassar will open in January as previously announced.

29 **Professor Angelika Amon (1967-2020)**
Amon is remembered both as a pioneer in chromosome imbalance and cell division research and a fearless leader who called out sexism in the community.

January 2021

20 **Limited top-optionality**
Random Hall and EC residents will be allowed limited top-optionality from 7 p.m. to 7 a.m. after the COVID-19 pandemic.

22 **Spring 2021 as scheduled**
Spring move-in and in-person instruction start dates were not delayed to March 15.

February 2021

4 **2021 Commencement speaker**
Renowned American lawyer and social activist Bryan Stevenson will be MIT's Class of 2021 Commencement speaker.

OPINION OPINION OPINION

OPINION OPINION OPINION

OPEN LETTERS

Student evaluation on the progress of the 2015 BSU/BGSA Recommendations

From: Kelvin Green II (SB student in Course 8)
Josué J. López (PhD candidate in Course 6)
Candace Ross (PhD candidate in Course 6)
Student Members of the Academic Council Working Group
To: President Rafael Reif
Provost Martin Schmidt
CC: Academic Council

On February 18, 2020 the Academic Council Working Group on Community and Inclusion (ACWG) presented the current status of the 2015 MIT Recommendations by the Black Students' Union (BSU) and Black Graduate Student Association (BGSA) to the Academic Council. During the meeting, Associate Provost Richard Lester inquired about student sentiment regarding current progress on the recommendations. Vice President and General Counsel Mark DiVincenzo suggested the question be directly addressed by ACWG student representatives. After curating student responses, we present the answer below.

In the last decade, nine reports and 177 recommendations have been posed to the Institute by students, faculty, staff, and alumni. Together, they raise concerns about inequities at MIT and present impactful solutions. These detailed evaluations of MIT highlight matters of race, gender, socioeconomic status, and the intersectional identities that contribute to diverse experiences at the Institute. In response to the 2015 BSU/BGSA Recommendations and in recognition of the need for a focused effort on diversity, equity, and inclusion (DEI), the Office of the President established the ACWG. As we approach the five-year anniversary of the BSU/BGSA Recommendations, one question stands out: *How is MIT planning to solve the outstanding diversity, equity and inclusion problems if we have yet to create an institute-wide strategic plan?*

It is now imperative for MIT senior leadership to create, support, and establish a diversity, equity, and inclusion strategic plan that incorporates solutions to existing problems and considers future needs. This will require intentional efforts that fundamentally change how we approach DEI problems today and will ensure transparency and accountability for the future. Most of MIT's DEI work has used a decentralized approach to problem solving.

Today, we call on each member of the Academic Council to actively contribute to an Institute-wide DEI strategic plan and engage in the efforts of the ICEO John Dozier and Associate Provost Tim Jamison. A strategic plan is more than a statement of values or the convening of a working group with limited resources. This plan must be an Institute-wide, multi-faceted effort that does not rely on a single office or single member of senior leadership. This means engagement from school deans and department heads during the entirety of the planning and execution process. A DEI strategic plan incorporates all pertinent stakeholders and learns from the work of ACWG. The plan will help us transition from being reactive to proactive about DEI. The plan must be readily available, clear, and inclusive. The outlined metrics for success will foster accountability and community engagement. Without an Institute-wide plan for DEI, we will not reach President Reif's goal of OneMIT.

Ten-year Black graduate student recruitment plan:

One of the long standing challenges this strategic plan must tackle is the stagnated enrollment of underrepresented minority (URM) graduate students. From 2005-2020, MIT's Institutional Research reports that the percentage of Hispanic/Latino graduate students has increased by only two percent. There has been *zero progress* for either Black or American Indian/Pacific Islander graduate students. This trend is worse at the faculty level: there has been no change recorded in the percentage of URM faculty in the past five years. Coupled with the climate survey that reports URM students feel less accepted and supported compared to other groups, this demands an Institute-wide course of action. These problems are magnified for students of intersectional identities, particularly women and queer people of color. Thus, MIT's strategic plan must be intersectional in order to be truly effective.

Recall that five years ago, the first BGSA recommendation specifically called for a 10-year plan to increase URM graduate students, in particular Black graduate students. As one of the premier problem-solving institutions in the world, it is difficult to comprehend why MIT has no plan or solution five years later. This is disappointing and disillusioning. In the same period, MIT has accomplished other ambitious initiatives such as the MIT.nano, the largest nanotechnology university facility in the U.S., and the Stephen A. Schwarzman College of Computing. These initiatives required the buy-in from multiple units and hundreds of faculty. This demonstrates that when properly motivated we can address longstanding goals regardless of complexity or cost. A decentralized culture cannot be the explanation for why we lack an Institute-wide focus on DEI.

Shifting burden from students and increasing faculty engagement:

For many years, students, staff and a subset of faculty, especially women and people of color, have carried the burden of leading DEI efforts. To be successful, faculty and senior leadership must lead DEI efforts and help carry the weight. Together their decisions directly influence the number of URM graduate students and faculty at the Institute. When the recommendations were made in 2015, there was an underlying expectation of Institute-wide involvement. Deans of the schools, department heads, and faculty must reflect upon the ways they have answered this call. These implicitly powerful stakeholders must elevate, support, and reward DEI work. Departments must incentivize faculty to fully engage with these issues, for instance through admissions and faculty recruitment processes. Given that school deans meet weekly and department heads meet monthly, the infrastructure is already in place for senior leadership to engage in contributing to systemic shifts. If we are going to make lasting change, we need the Office of the Provost, ICEO, School Deans, and Department chairs to be on the same page and contribute their skills and insights to ensure a strategic plan is created and executed.

In closing, we take note that the official role of the Academic Council is to "confer on matters of Institute policy." This call for an Institute-wide strategic plan falls perfectly in line with the charge of the Academic Council. We therefore encourage active participation from all Academic Council members. We recognize that MIT as a whole cannot be centralized, yet coordinating the groups, committees, students and, most importantly, faculty around DEI is critical in our path forward. Coordinating these efforts and creating a strategic plan is a laborious task but it will drastically improve the culture, experiences, and outcomes for underrepresented groups at MIT. Our goal is that the next generation of students need not duplicate these sentiments in a similar letter in another five years. **We call upon MIT to establish an Institute-wide body this Fall with the charge to create a long-term strategic plan, including concrete measures to increase the number of Black graduate students. To be effective this strategic plan must be backed by the purse strings of the Institute.** In presenting these perspectives today as student members of ACWG, we are committed to helping you shape this strategy today and moving forward.

END OF LETTER

Why Luis Videgaray must leave MIT

Dear members and friends of the MIT community,

One year ago, MIT was embroiled in the horrifying scandal involving child sex trafficker Jeffrey Epstein. This led to the departure of MIT Media Lab director Joi Ito. Today, another scandal-ridden faculty member holding a leadership position at the Institute is bringing turmoil to MIT: Mexican politician Luis Videgaray Caso. The scandals include corruption, abuse of power, criminal association, electoral crimes, money laundering, and conflicts of interest.

Who is Luis Videgaray?

Before coming to MIT, Luis Videgaray was Mexico's Finance Minister (2012–2016) and then Foreign Minister (2017–2018) during Enrique Peña Nieto's presidency. Luis Videgaray was also the Secretary of Finance for the State of Mexico from 2005–2009, when Peña Nieto governed the state, and campaign coordinator for Peña Nieto's 2012 presidential run.

Videgaray joined MIT in July of 2019 as a senior lecturer at the MIT Sloan School of Management and as a distinguished fellow of the MIT Internet Policy Research Initiative. Most significantly, he was appointed Director of the AI Policy for the World (AIPW) Project, a joint program between the Sloan School and the Stephen A. Schwarzman College of Computing (SCC).

Videgaray was hired to lead the AIPW project as an "expert in geopolitics and AI policy" who would further the SCC's stated mission: to "position [MIT] as a key player in the responsible and ethical evolution of technologies that will fundamentally transform society." In particular, Videgaray and the AIPW would strive to "make AI's ethical impact 'a truly global discussion,'" and "explore the best AI policies for countries around the world based on various geopolitical considerations," as well as considerations of "societal implications" and of how to "uphold democracy."

Videgaray's Involvement in Corruption

MIT praised Videgaray's political career when it hired him. However, he has been the subject of multiple journalistic investigations and lawsuits involving him and the government ministries he has led in corrupt schemes.

Most recently, as of August 11, 2020, Videgaray, together with Peña Nieto, is being formally investigated by Mexico's Office of the Attorney General. The investigations stem from testimony and evidence offered to the Attorney General by Emilio Lozoya Austin during his own trial for corrupt dealings with the Brazilian builder Odebrecht. Videgaray, along with Peña Nieto, is accused of funneling millions of dollars in bribes from Odebrecht first into Peña Nieto's campaign, and then later into the pockets of legislators in order to ensure their support for Peña Nieto's major structural reforms. According to some legal experts, these investigations could result in charges against Videgaray and the former president as severe as organized crime.

It may or may not be the case that Videgaray will ever be found guilty by a judge of committing crimes himself. However, the breadth and depth of credible accusations against him raise serious doubts over his moral authority to lead research projects about social, ethical, and political consequences of AI policy, let alone to explore the "best" AI policies for "upholding democracy" in other countries.

The pursuits of scientific knowledge and technological development must be joined at the hip by a commitment to ethics. Otherwise, they can serve to intensify injustices, inequalities, and abuses of power. By employing Videgaray, whose ethical standing is in serious question, MIT is needlessly undermining its own moral authority to steer scientific progress towards the betterment of society, as well as its integrity as an institution that handles public funds.

As such, **MIT should end Videgaray's appointments as senior lecturer, as director of the AIPW Project within Sloan and the College of Computing, and as distinguished fellow at the MIT Internet Policy Research Initiative.**

Neither MIT nor any other institution is perfect. However, concrete actions such as this can have a positive impact institutionally, nationally, and internationally, as well as individually for many members of this great community. Corruption and impunity are not to be condoned. MIT should not risk sending the message that politicians across the world can abuse their power while in office, and then be rewarded with important positions at U.S. institutions.

The main authors of this letter, in alphabetical order by last name:

Patricia Arnal Luna SM '20 graduated with an MSc in Engineering and Management from MIT and is an environmental sustainability consultant.

Rodrigo Escandón Cesarman SM '20 graduated with an SMArchS in Architectural Design from the MIT Department of Architecture.

Leonardo Escudero MBA '20 graduated with an MBA and a Healthcare Certificate from the MIT Sloan School of Management.

Alonso Espinosa Domínguez '20 graduated from MIT with a BS in Mathematics.

GUEST COLUMN

MIT Divest's response to the Climate Grand Challenges

Climate change will not wait for research proposals; MIT must act now

By MIT Divest

On July 23, President Reif announced the start of the Climate Grand Challenges, what he described as an "important step in MIT's ongoing efforts to take action against climate change." The challenge invites tenured faculty to submit research proposals for "large scale change." MIT will pick five to six of these projects and secure funding for them. However, MIT's emphasis on "applying cutting edge technologies" to the climate crisis is insufficient.

Climate change is a current crisis, and a year-long process of submitting research proposals does not match the time frame in which we are already seeing the impacts of ecological destruction. Our planet and its people require immediate action and unique solutions that interrupt the status quo. As a powerful institution with intelligent and determined community members, we can do better than rely on future research. We must act, and we must make bold institutional changes to meet the climate crisis rather than sticking to our usual paradigms.

There is no doubt in MIT's ability to produce technological and scientific advancements for society. However, MIT also has economic and societal power as a renowned institution with a large endowment, as well as a continuous presence in Washington D.C. It is time MIT make use of these resources and privileges to help solve the biggest interdisciplinary problem of our generation instead of claiming that climate change can be fixed with enough research funding.

A key pitfall of the Grand Challenges is a review committee lacking an emphasis on the social, political, economic, and ethical dimensions of climate change. After PIs write Phase I Letters of Interest about solving climate problems, their submissions are examined by a Faculty Review Committee. The Committee then selects some PIs to further develop their ideas in white papers with up to $100,000 funding in Phase II.

The Faculty Review Committee plays a significant role in selecting feasible and necessary solutions. Although the Committee includes faculty from all five schools and the Schwarzman College of Computing, the majority are from the Schools of Science and Engineering. Of the 26 members, only three are from the School of Humanities, Arts, and Social Sciences, and two are from the School of Architecture + Planning. In contrast, 12 faculty members are affiliated with the School of Engineering. This imbalance prevents selection of the most robust and equitable solutions in the Phase I review process.

During Phase II, white papers are reviewed by researchers and leaders in the sciences, humanities, public policy, management, and more. While we appreciate the diversity of expertise at this stage in the process, we believe a crucial voice is missing: frontline climate activists and at-risk communities. Particularly for climate adaptation projects, an accurate assessment of community needs is necessary. We believe this cannot take place when feedback on PIs' ideas is limited to the academic, commercial, and policy elite.

If MIT is staking our future on technology, we must make sure any innovations are equitable, inclusive, and socially sound. Because of the importance of selecting the best submitted ideas, we demand a more even division among different schools in the Faculty Review Committee. More importantly,

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OPINION OPINION OPINION

ARTS ARTS ARTS

OUR FAVORITE MOVIES OF 2020

DA 5 BLOODS DIR. SPIKE LEE

Spike Lee's war film consumes the audience in the characters' psychological states, altered by the Vietnam War that never truly ended for them. The rowdy four friends ("Bloods") return to Vietnam, where they fought in the war and seek to honor Norm, the fifth Blood who glued the group together and died back during the war. The actors all deliver stellar, haunting performances that capture the nature of greed, trauma, and blackness in America. Chadwick Boseman plays Norm, who, much like Boseman himself, is as timeless and legendary as the war that took his life.

—Lulu Tian

COURTESY OF DAVID LEE, NETFLIX

BOYS STATE DIR. AMANDA MCBAINE AND JESSE MOSS

In a time of political turbulence, Boys State allows us to step back and reexamine patriotism and public service from the perspective of teenage Texan boys. The premise of the documentary is so rich with competitive, youthful energy, and the film bursts into some surprisingly poignant and insightful moments. Directors Amanda McBaine and Jesse Moss specifically highlight voices of diversity within a largely homogeneous body and uncover some glints of hope and understanding amongst what seems at first glance to be just another testosterone-filled summer camp. Powered by an impressive collection of observational and interview footage, the documentary is exceptionally entertaining and skillfully crafted — certainly a blueprint for subject-driven documentaries in the future.

—Lulu Tian

JUST MERCY DIR. DESTIN DANIEL CRETTON

On the surface, *Just Mercy* recounts the battle between a group of equal justice fighters and a society entrenched in racial prejudices. But beyond detailing the overturning of the death penalty, the film transcends into a story about the importance of conviction and compassion. Newly minted lawyer Bryan Stevenson (Michael B. Jordan) embarks on a journey to defend wrongly sentenced death row inmates in Alabama, a journey that is met by every obstacle imaginable. And in spite of all the trials and tribulations, he perseveres and fights for the justice in which he believes. Even without knowing that it's a true story, we can predict most of the plot, but this actually allows for more focus on how the story is told rather than what the story will be. And this intention is why *Just Mercy* stands out as one of the best films of 2020. From Destin Daniel Cretton's meticulously framed shots to the evocative performances of the entire cast, *Just Mercy* captures the deep pain associated with injustice. Its story is as poignant today as it was back in 1989, perhaps even more so. 2020 was a year of tumult, and *Just Mercy* reminds us of the humanity within each of us. We cannot wait to be inspired by the real Bryan Stevenson when he speaks at the 2021 Commencement.

—Erika Yang

JAKE GILES NETTER

SOUL DIR. PETE DOCTER

There was no better film to conclude 2020 than Pixar's *Soul*. Released just in time for the holiday season, *Soul* was a heartwarming and introspective piece that helped to heal the giant void that this year was. Pete Docter visits the age old questions of what is the meaning of life and what is one's purpose in life through the seemingly insignificant life of middle school band teacher Joe Gardner (Jamie Foxx) whose dreams of becoming a famous pianist fall down a sinkhole. Aptly set in the hustle and bustle of New York City, the film reminds us that while there may be a gazillion and one things going on in our life, it's important to stop and remember the small things — stop and smell the roses, a message that's all the more significant in a year where time felt halted personally but the world was still blazing on. There's not just one single thing that makes life what it is even if it may seem like it sometimes. *Soul* conveys this message beautifully. Never has a single helicopter seed falling through the air made me reconsider my life before. And of course the animation itself was as spectacular as one would expect it to be and perfectly balances both the realistic and more supernatural forms of the film. From the gorgeous visuals to the reflective storyline, *Soul* cements its place as the best soul searching film of 2020.

—Erika Yang

COURTESY OF DISNEY/PIXAR

MINARI DIR. LEE ISAAC CHUNG

We know this hasn't been released in theaters yet, but does that mean we can count it as best of 2020 and 2021? Yes, it's that good. Steven Yeun is on his way to becoming a household name, but Han Yeri and the entire cast shine in their individual roles and as a cohesive unit. It's hard to find a film that really understands the love-hate dynamics that characterize family, but *Minari* articulates those emotions in a way that has you crying without even knowing why.

—Lulu Tian

MELISSA LUKENBAUGH, COURTESY OF A24

OUR FAVORITE TV SHOWS FROM 2020

THE QUEEN'S GAMBIT DIR. SCOTT FRANK

The main cause of the spike in chess players this year, *The Queen's Gambit* reigns as one of the most memorable and compelling shows of 2020. Centered around chess prodigy Beth Harmon (Anya Taylor Joy), the series depicts the whirlwind that is Beth's life. *The Queen's Gambit* is notable in that it lets its protagonist completely fall. Beth is prodigal, yes, but she is not without her fair share of inner demons, and the show delves into this aspect extremely well. It becomes more than just a girl who is good at chess – this premise alone wouldn't have been enough for me (and everyone else) to binge the entirety of the show in a (at most) few days. Scott Frank and Joy expertly carve out the intricacies of Beth's character, and it's like we experience the highs, the lows, and the rock bottoms with her, giving the audience reasons to continuously root for Beth. And the story was not as predictable as I expected, which provided a welcome constant element of suspense and surprise that helped to carry the show. On top of the brilliant screenplay, the cast delivered excellent performances all around, with Joy being especially exceptional. The cinematography of the show was just as astounding as the rest of the production. If you were to take a gambit on any series from 2020, *The Queen's Gambit* is one that is definitely worth taking.

—Erika Yang

CRASH LANDING ON YOU DIR. LEE JUNG-HYO

Crash Landing on You might have been one of the biggest Netflix, if not overall, titles this year. As Korean TV continues to partner with Netflix and take over the global stage, there's no doubt that even more people will succumb to the infallible formula of boy + girl + a love that wasn't meant to be. Okay, *Crash Landing On You* is more than that, from the setting of North Korea (with some actual research behind it) to the focus on elite families' relationships. Similar to writer Park Ji-Eun's previous drama *My Love From Another Star,* where a female celebrity falls in love with an alien, *Crash Landing* is also a quality K-drama (although not *Goblin* tier) with likeable characters and relationships to root for. It's also worth noting that a love separated by the 38th parallel somehow feels just as impossible as a love separated by galaxies. A quietly bold commentary amongst it all.

—Lulu Tian

RAMY SEASON 2 CREATED BY RAMY YOUSSEF, ARI KATCHER, AND RYAN WELCH

Ramy highlights a sarcastic, confused Arab Muslim American milennial, who isn't so much bound by his identity labels as he is by his struggles with religion, sex, and self-awareness. Expanding upon the wit and brutal honesty of Season One, the protagonist, sharing a name with creator and actor Ramy Youssef, reveals even more of his selfishness in downright outrageous ways but also moments uncomfortably close to our own undeniably imperfect selves. Especially with the addition of the Sheikh (Mahershala Ali) that Ramy clings onto throughout his religious and personal growth, the show continues to be thoughtfully spiritual, while also down-to-earth. *Ramy* is one of the truest and funniest TV shows out there today, grounded in the humor of everyday moments and brutally honest storytelling.

—Lulu Tian

ARTS ARTS ARTS

SPORTS SPORTSSPORTSSPORTSS

Losing a last chance: diaries from MIT's track and field national qualifiers

Four MIT seniors recount the abrupt end to their sports season, semester, and MIT career

By Alana Chandler

Just hours before departing for NCAA DIII Indoor Track and Field Nationals, MIT informed its national qualifiers that they would not be permitted to attend the meet. Four MIT seniors who qualified recount losing their final semester and the opportunity of a lifetime. Their stories, gathered from their journal entries and reflections, are woven together below from March 10, six days before the campus evacuation, to their last day at MIT.

Marissa McPhillips qualified in the mile and distance medley relay (DMR). She had previously qualified in the DMR three times, mile twice, and 800 and 1500 meters once.

Jenna Melanson qualified in the 3000 meters race. She previously qualified for track Nationals four times.

Alec Reduker qualified in long jump, triple jump, and high jump. He previously qualified in high jump four times and long jump once.

Margaret Trautner qualified in the mile, 800 meters, and DMR. She previously qualified for track Nationals in the 800 meters four times and the DMR once.

Tuesday, March 10, 2020: MIT notifies students to leave campus by the following Tuesday.

Reduker: Woke up to rumors. It didn't feel real. I didn't want to believe it. It was the only thing anybody talked about. I was so mad, but didn't have anybody to be mad at. I couldn't believe that my last semester with my friends was just gone. Things would never be the same. I was still dead set on going to Nationals at this point.

Trautner: I found out that we were all being forced to go home within six days. No Senior Ball, no Senior Spotlight in my sorority, no Senior Week. I held it together for hours — through the impromptu celebration on Killian, through our last track workout, and through the last house dinner I helped prepare. Then I called my mom. The "waterworks" showed up in full force, and I cried for the next two hours until I finally sank into sleep. But we were going to leave for Nationals at 1 p.m., and even though I now knew it would be my last meet, I was beginning to be okay with that. After all, I fully intended to make it one for the books.

Wednesday, March 11, 2020: On the intended day of departure to North Carolina for NCAA DIII Indoor Track and Field Nationals, MIT prohibits its athletes from competing.

McPhillips: The first thing I saw was the messages in our Nationals group chat: Coach Taylor had sent an email about our trip to Nationals being canceled. Canceled? CANCELED?

Reduker: I had this idea in my head until I saw Coach Taylor walk out of the meeting to speak to us. Seeing him upset, hearing his voice quiver — that was when it hit me. I felt so helpless; if Coach Taylor couldn't make it happen, then I knew that it was really finished.

McPhillips: He started explaining that the decision had been made, and there would be no changing it, as much as he tried to fight. Our trip was canceled. Additionally, all spring seasons would be canceled. Outdoor was lost.

It felt like a punch in the stomach. It felt like every cliché you can think of to describe a broken heart. Because that's exactly what happened. Our hearts broke.

"We're a family," Coach Taylor said, "and you're my kids … my life's blood."

Reduker: I didn't realize how much I loved these people until today. I saw them almost every day for four years, the little five minute conversations you have in the locker room add up. The one thing that we all shared is passion. We were all there because we weren't afraid to give it everything.

Thursday, March 12, 2020: Aftermath.

Reduker: I can't even begin to explain how hard I worked for this. Every time I go to bed, every meal I eat, every time I don't want to work on an essay, I think about high jumping. I have cried over track, and I have also had the single most happy moments of my life in track.

Trautner: The race plans I had didn't go away. My desire to win didn't go away. I raced every race as if it were my last, and I had the time of my life doing so. I just wish I'd known this was the end.

Friday, March 13, 2020: MIT informs students to leave two days earlier than previously indicated, Sunday instead of Thursday.

McPhillips: On Thursday, the NCAA cancelled every athletic competition remaining for the rest of the year, including Indoor Nationals. MIT ended up making the right decision. I was glad we sobbed on the Z Center floor instead of an airport, on a plane, in a hotel room, or on the Nationals fast track itself.

Melanson: I was initially angry because I felt they did not understand what they were taking from us, what it's like to be an athlete. Until you've competed at that level, you don't know what it's like to dedicate a very large part of your existence to something.

Trautner: I went into the Z Center to clean out my locker and return my gear. Turning in my singlet was heartbreaking. Perhaps realizing I don't need my spikes anymore was harder. When I returned to my sorority house, peoples' parents were showing up in masks to move their daughters out. People are panicking; when I stopped at Target last night to buy shipping tape, the shelves of canned food and dry goods were cleared out.

This is so much bigger than a disrupted track season.

Saturday, March 14, 2020: Goodbye.

McPhillips: The seniors ended up walking to the Mass. Ave. bridge to watch the sun set. It was beautiful. I can't really explain what I felt on that bridge as the wind threatened to blow us into oncoming traffic. Nothing else mattered but the people I was surrounded by. The love for my teammates extends beyond track, beyond MIT, and I can't wait until we're all together again.

Trautner: Watching the sunset together for the last time, we ended up laughing instead of crying. It was one of those moments where the only reason you can be happy is that you know your sadness is shared by those around you.

Reduker: This is my last night at college; it's the first time that's set in. My room is empty now. These are my last few moments here. I won't get to say all the goodbyes I wanted to, there's just not enough time.

Melanson: One of the things Coach Taylor told me at Nationals last year, a lesson I've been slapped in the face with again this time around, is that you can't always count on the future. Sometimes you just have to take the opportunities that are right in front of you.

Trautner: I was never really into celebrations before, graduation ceremonies and the like. But now I realize that celebrations make the harsh life transitions more of a launch than a fall. Celebrations allow us to reflect and figure out how we will stay true to ourselves through the next phase of life. Change without celebration is jarring.

SWIMMING AND DIVING

MIT Men's and Women's Swim and Dive both win NEWMAC

Women's and men's teams earn 10th and 12th consecutive titles, respectively

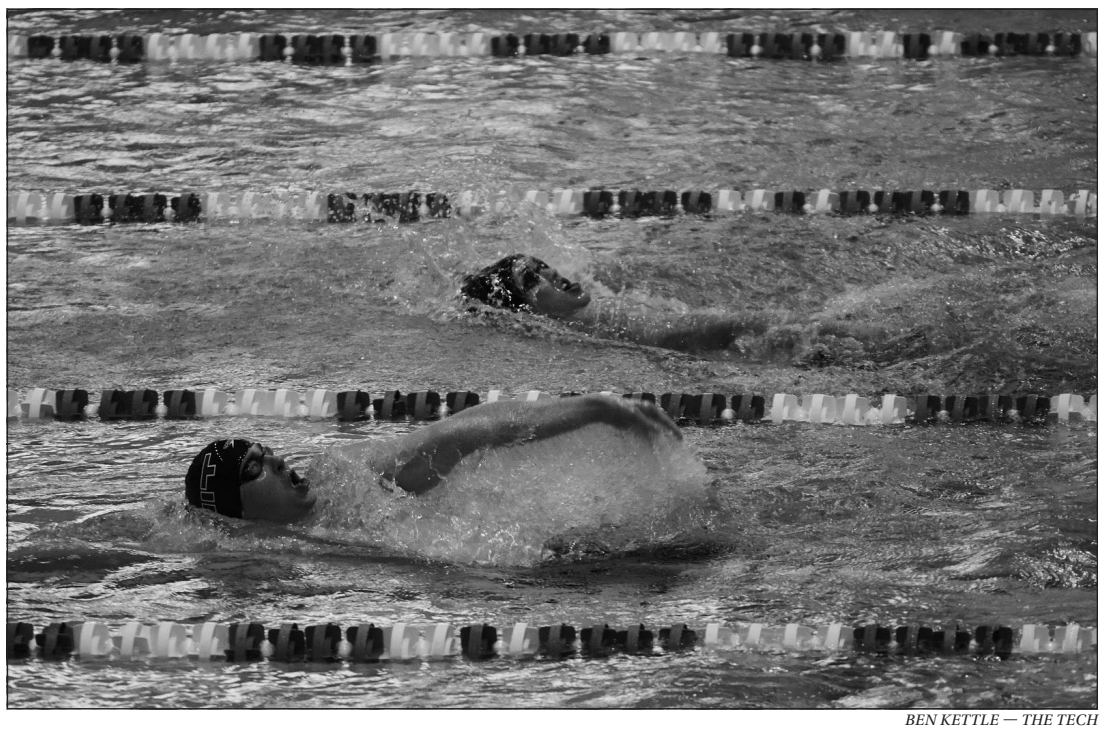
By Suleman Thaniana
SPORTS EDITOR

The New England Women's and Men's Athletic Conference (NEWMAC) Men's and Women's Swimming and Diving championship was held at the MIT Zesiger Sports and Fitness Center Pool from Thursday, Feb. 20 to Sunday, Feb. 23. The men's team finished first with 1535 points, while the women's team finished first with 1356.50 points. At the conclusion of the fourth day, Bouke Edskes '20 was named the NEWMAC Men's Swimmer of the Year for the third straight year while Adam Janicki '23 was named the NEWMAC Men's Rookie of the Year. In the women's categories, Edenna Chen '23 was named the NEWMAC Women's Rookie of the Year and Blake Zhou '20 was named the NEWMAC Women's Diver of the Year.

The men's team set a number of records and victories over the four-day championship. They started off on the first day by breaking the meet, open, pool, and program records in the 800-free relay with a time of 6:37.29. The 800-free relay consisted of Alex Ellison '22, James Richardson '23, Kevin Fang '21 and Edskes. On the second day, the team broke four records, including the 200-free relay consisting of Sam Ubellacker '20, Justin Liu '21, Emilio Sison '20, and Kyri Chen '22. Later, Trevor Carter '23 claimed the league title in the 500-free with a time of 4:30.18 and Ubellacker broke the NEWMAC meet record time in the 50-free with his swim of 20.00 seconds. Last, Tim Kralj '20, Henry Wang '23, David He '22, and Liu won the final of the 400-medley relay in a time of 3:21.55.

On the third day, in the diving well, Jay Lang '22 broke the MIT program as well as the NEWMAC meet and open records with his preliminary score of 605.10. He returned to finals as the top-seed and scored 587.30 points for the conference title. Later on the third day, the 200-medley relay 'A' team of Henry Hu '21, Chen, Edskes, and Ubellacker closed the night session by breaking the NEWMAC meet record with a time of 1:28.51, just 0.03 seconds shy of tying the NEWMAC open record. The medals and records did not end as the final day's time trial session began with Edskes breaking the national record in the 100-I.M. with a time of 49.18, followed by him breaking the meet record for 200-fly with a time of 1:47.33. This was followed by Jordan Ren '22 breaking the NEWMAC meet, NEWMAC open, and MIT program record in the 200-breast as he won the event with a time of 2:00.60. The Engineers closed the championship with another meet record as the quartet of Ubellacker, Ellison, Liu, and Chen won the 400-free relay with a time of 2:58.45 to win the final event of the night. Over the course of the meet, Men's Swimmer of the Year Edskes won five events and set four meet records.

The women also made the MIT community proud with their excellent performances. This started off with a day-one victory in the 800-free relay comprised of Hannah Mahaffey '21, Lindsey Bjornstad '22, Laura Rosado '22, and Shannon Hagmaier '22. On the second day, MIT women's 200-free relay team smashed the NEWMAC meet, NEWMAC open, MIT pool, and MIT program record with a swim of 1:33.30. The 200-free relay team consisted of Olivia McGrath '21, Lilia Staszel '20, Hagmaier, and Bjornstad. Alongside the relay, the women grabbed four other gold medals in the pool, including the 400 medley relay. In the diving well, MIT swept the top two spots on the 3-meter board. Deborah Wen '21 claimed the league title with a qualifying score of 526.85, while Zhou took home second place with a qualifying score of 517.75.

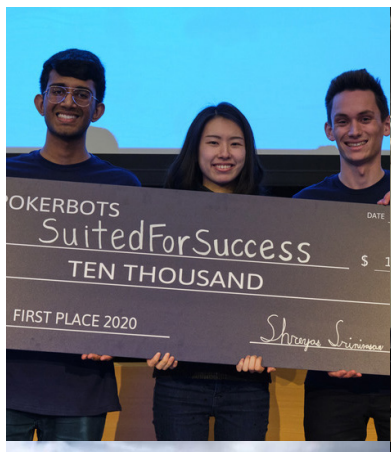


BEN KETTLE — THE TECH

Henry Hu '21 (top) and Adam Janicki '23 (bottom) of MIT Men's Swimming and Diving swim in the men's 200-yard backstroke final in the NEWMAC championship Sunday.

On the third day of the meet, the women earned two medals alongside various other top finishes. The 200-medley relay 'A' team of Nanette Wu '20, Chen, McGrath and Staszel broke the NEWMAC meet record with their swim of 1:43.25. This was followed by Chen's excellent swim in the 100-breast as she broke the NEWMAC meet record with a time of 1:02.29. On the final day of the meet, Chen claimed top honors with her first place finish in the 200-breast while Mahaffey claimed the league title in 200-fly. In the diving well, Zhou claimed the 1-meter conference title with a score of 505.15. To conclude the meet, the Engineers won the 400-free relay with a time of 3:27.19. The four Engineers who made up the relay were Delaney Burns '20, Rosado, Bjornstad, and Hagmaier.

Due to their outstanding performance in the NEWMAC championship, the swimmers will next travel to Greensboro, North Carolina for the NCAA Division III Championship, to be held at the Greensboro Aquatic Center from March 18 to March 21.


SuitedForSuccess
TEN THOUSAND
FIRST PLACE 2020

MIT Class of 2025 EA Admits Livestream!
Paolo Adajar (he/him)
Nisha E Devasia (she/her)

BLACK LIVES MATTER
BLACK LIVES MATTER
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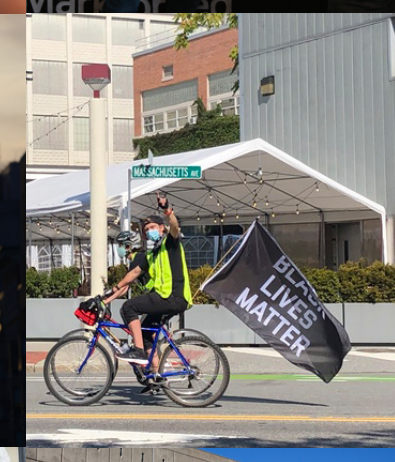
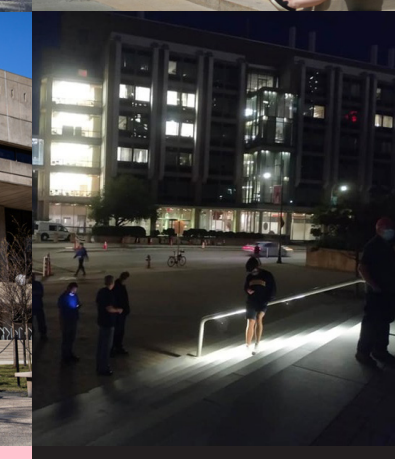
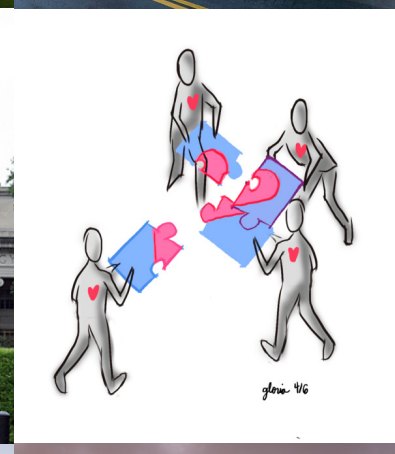
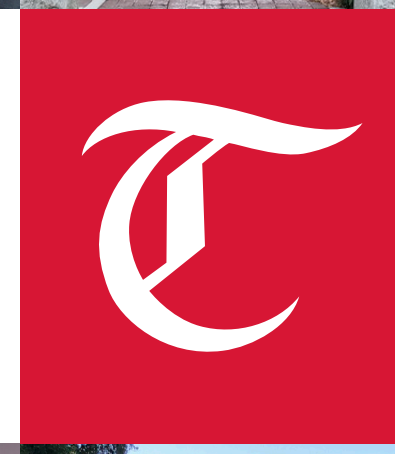

BLACK LIVES MATTER

FRED DESK



"At MIT, the answer...
...Unequivocally, is YES."
– L. Rafael Reif
President of MIT

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